J54A Chassis Training Manual

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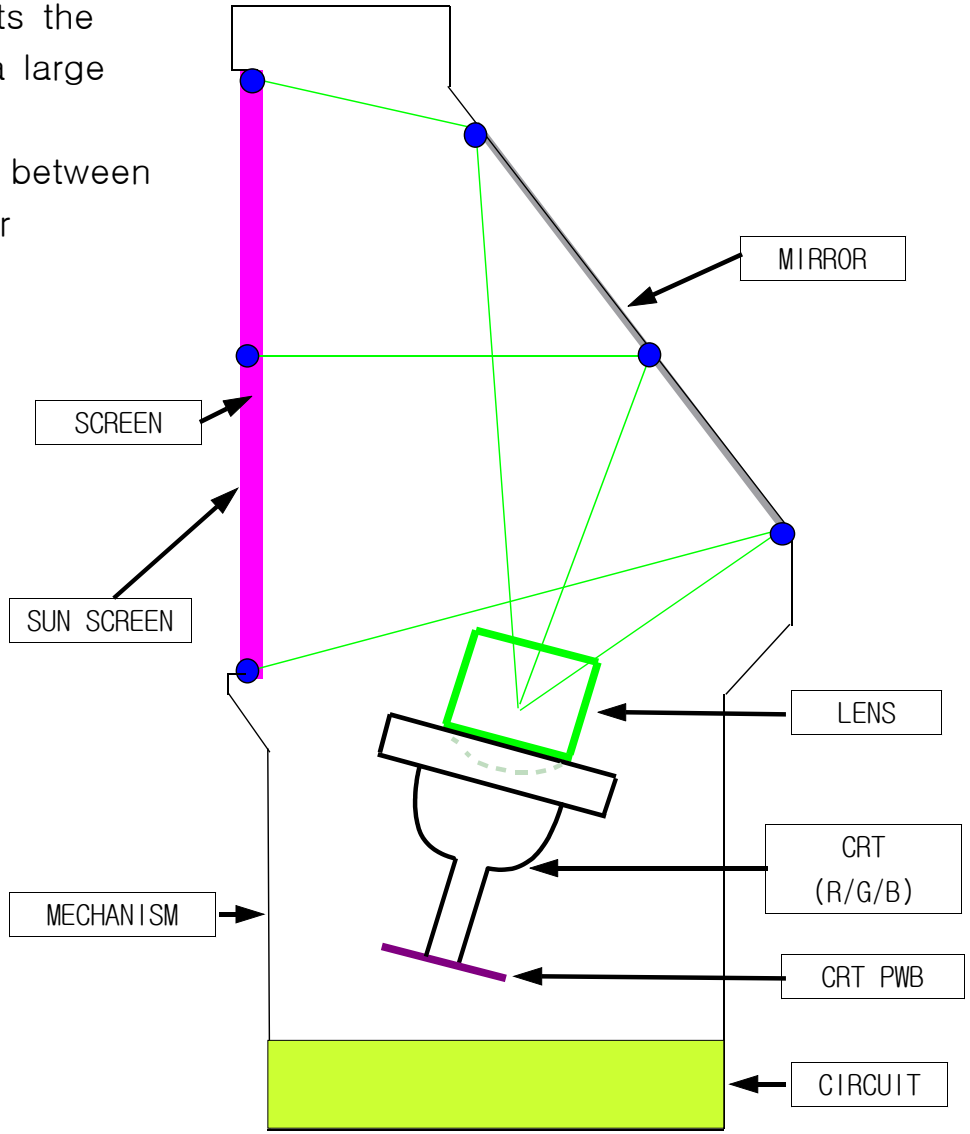
1. Basic Principles of PJTV

A rear-type CRT projection TV magnifies and projects the image formed by R, G, B monochroma CRTs onto a large screen, finally displays the image on the screen.
Different from a front-type projector, it has a mirror between lens and screen that is suitable for the home theater because it is slim type.



▶ Optical Block

- R, G, B monochroma CRTs
- Lens and mirror that magnify and project the image from the CRT onto a large screen.
- Screen that forms the ultimate image that is projected through the lens.

▶ Mechanical Block

- Cabinets, doors, etc. that consist of the exterior of a projection TV.

▶ Circuit Block

- Circuit composed to form the image on CRT
- Signal processing unit of input video and sound
- Power supply unit that drives circuit to operate.

Optical Part

An optical block is classified into three major parts, **CRT, LENS and SCREEN**

▶ **CRT Part**

It consists of 7″ monochromatic CRT (Red, Green and Blue) and its peripheral factors in similar to a common visual straight CRT, an electron gun emits electrons collided onto a fluoressent front of CRT generating an image.

It requires a cooling system against over heating resulted from establishing a high degree of brightness at an infinitesimal area.

▶ **LENS Part**

It consists of many layers of Lens and Mirrors in order to magnify/project an image of CRT and enhanced color purity Lens with respect to Red, Green and Blue CRT respectively.

- One main lens : It magnifies a CRT image to a certain scale and determines a final image scale on a screen.
- Three calibrating lenses : It corrects a degree of chromatic purity/aberration.

It determines a main spec. of appliance, such as composition scale, projection distance, image size.

▶ **SCREEN Part**

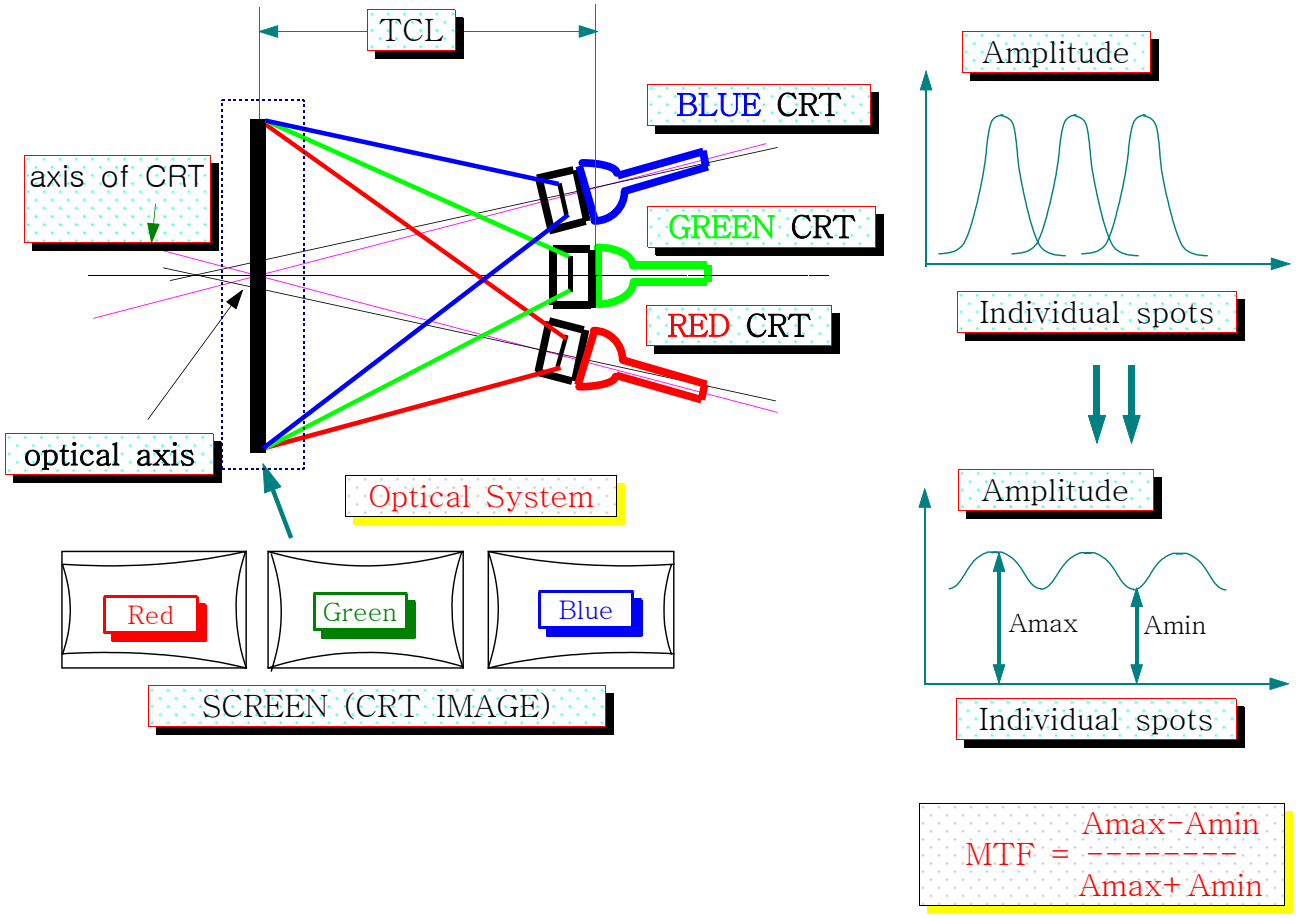
It makes a final and optimum quality of image by reflecting or refracting a CRT image.

It consists of Fresnel, Lenticular and Contrast screen.

- Fresnel : It converges projected lights
- Lenticular : It diffuses out a light to each viewer's location
- Contrast screen : It improves a status of contrast.

Optical System

◎ MTF(Mean Transfer Function) : Principal parameter that indicates the performance of projection lens.
◎ F/number(Focal Length / Pupil Diameter) : Defines the brightness of Optical System.
◎ TCL(Total Conjugate Length) : Defines the depth of Optical System.
◎ Transmittance : The lens has Anti-reflection coating to reduce the loss of light.

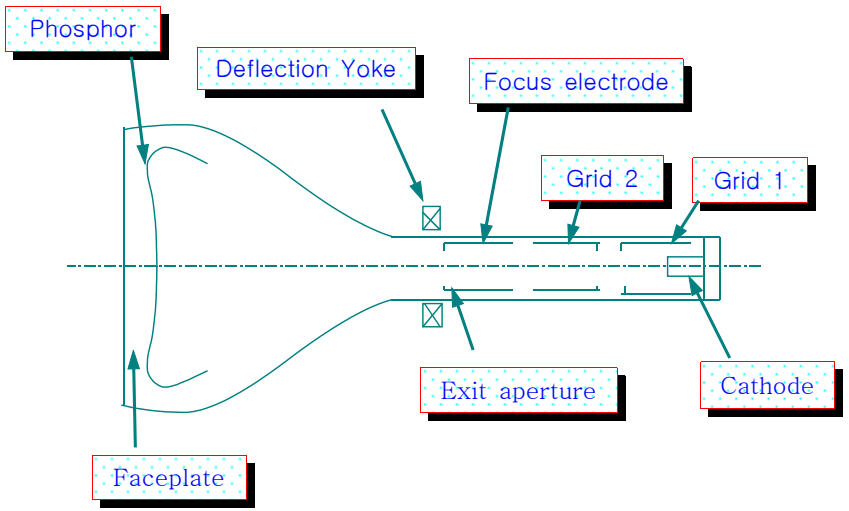


CRT Structure

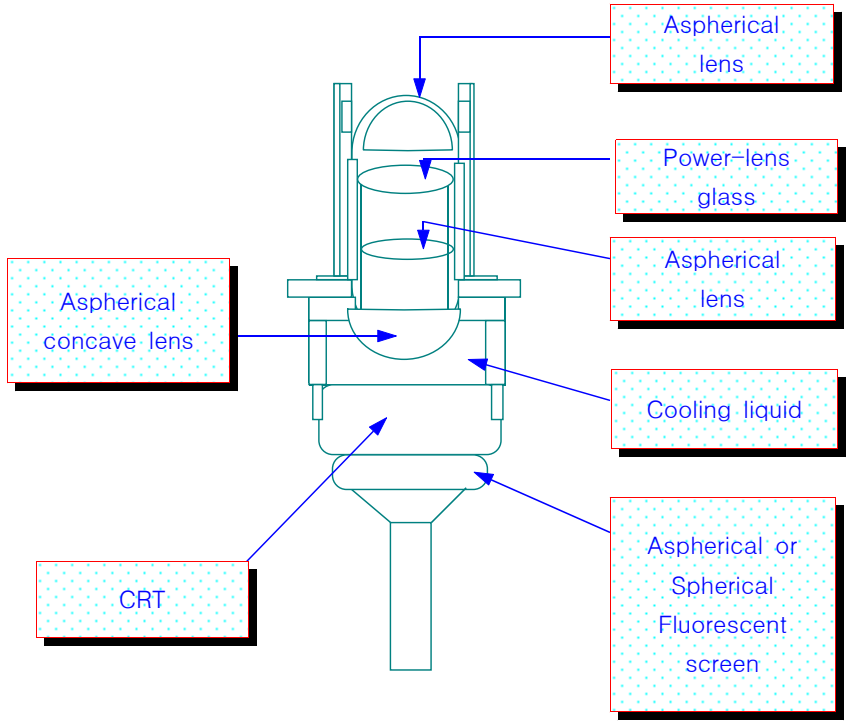
▶ CRT Structure

: CRT consists of four major parts as follows;

- Bulb : It surrounds a CRT to maintain a vacuum state inside the CRT.
- Electron Gun : It emits electrons toward a fluorescent screen of CRT.
- Focusing section : It includes Deflection-Yoke controlling electron beam directions.
- Screen section : It includes fluorescent screen luminescent for electron beam making an image.



CRT Side View

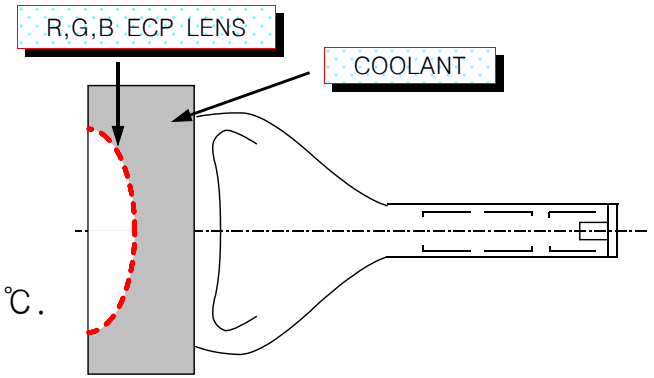


7" MONO CRT

Cooling System

▶ Cooling System

- A magnification/projection type of CRT requires a higher input voltage as compared to that of a visual straight CRT. Thus a coolant should be equipped in the front of CRT. It keeps a surface temperature of CRT at a constant degree. On the other hand, it prevents over-aberrations by a variable refractive index to increasing temperatures, degradation of a fluorescence and breakdown of valve due to a luminescence, etc.
- A surface temperature of CRT: 100℃ for the center, 80℃ for the surroundings a coolant keeps down the temperature at 50 ~ 60℃.



■ Comparison between coolant compositions

SUBJECT	Ethylene Glycol	Glycerin
Role	Preventing a drvness	Coolam
Molecular formula	CH2OHCH2OH	HOCH2CHOH
Boiling pt.	198℃	290℃
Freezing pt.	-12℃	20℃
Flash pt.	116℃	177℃
Firing pt.	400℃	200℃
Property	Colorless, odorless, sweet and hygroscopic liquid	Colorless, odorless, sweet and hygroscopic liquid Syrup type of light yellow liquid
Storage	Keep under a dry and cool contition	
Others	May cause a irritation if contacted or harm your eyesight if inhaled	

Lens Structure

▶ Lens Structure

: It consists of three parts

- ECP Lens(Enhanced Color Purity Lens) :

  Each CRT of Red, Green and Blue emits a monochromatic light where there is a radiant light in an inapplicable bandpass.

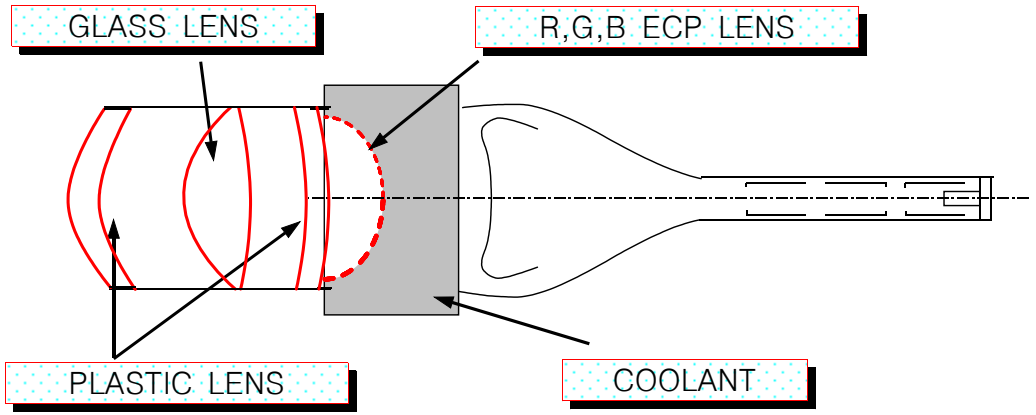
  ECP lens of Red, Green clear blocks out the radiant light and improve a degree of color purity.

- Spherical Glass Lens :

  It determines a magnifying power of optical instrument.

- Aspherical Plastic Lens :

  It calibrates a monochromatic aberration(Spherical, Comma, Aberration, Front-face curvature and Front-face distortion) resulted from a Glass Lens.



CRT-Lens Coupling

Mirror Part

The mirror changes the optical path of light projected through the projection lens, in order to slim the volumn of the set.

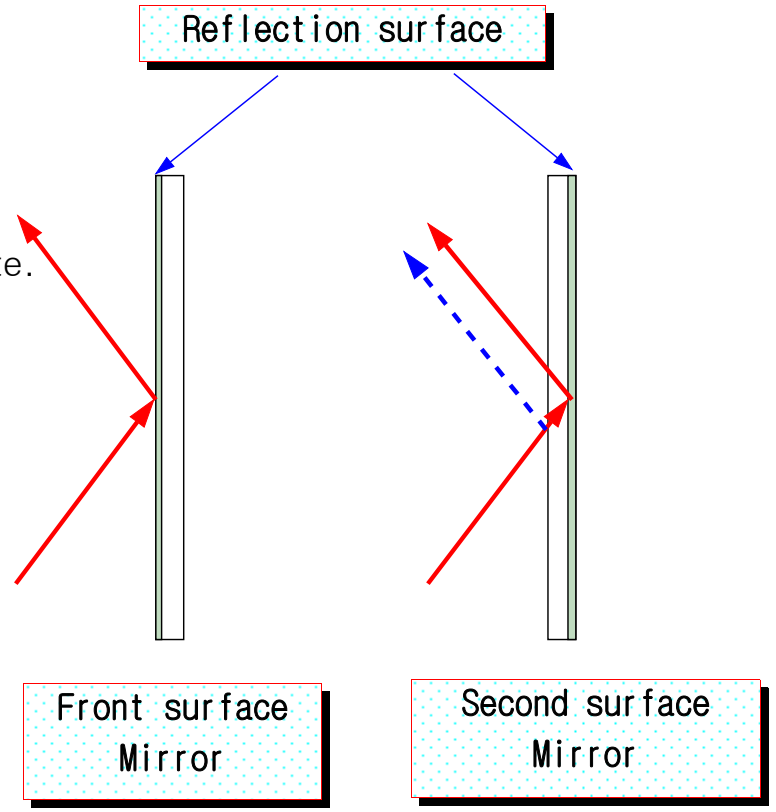
▶ Classification of Mirror

☞ Front surface Mirror

- Reflection surface is placed in front of the glass plate.
- There is no multiple reflection of light.
- High price.

☞ Second surface Mirror

- Reflection surface is placed behind the glass plate.
- There is multiple reflection of light.(Approx. 8~9%)
- Low price.



Screen Part

▶ Screen Structure

: It consists of two parts (Fresnel + Lenticular)

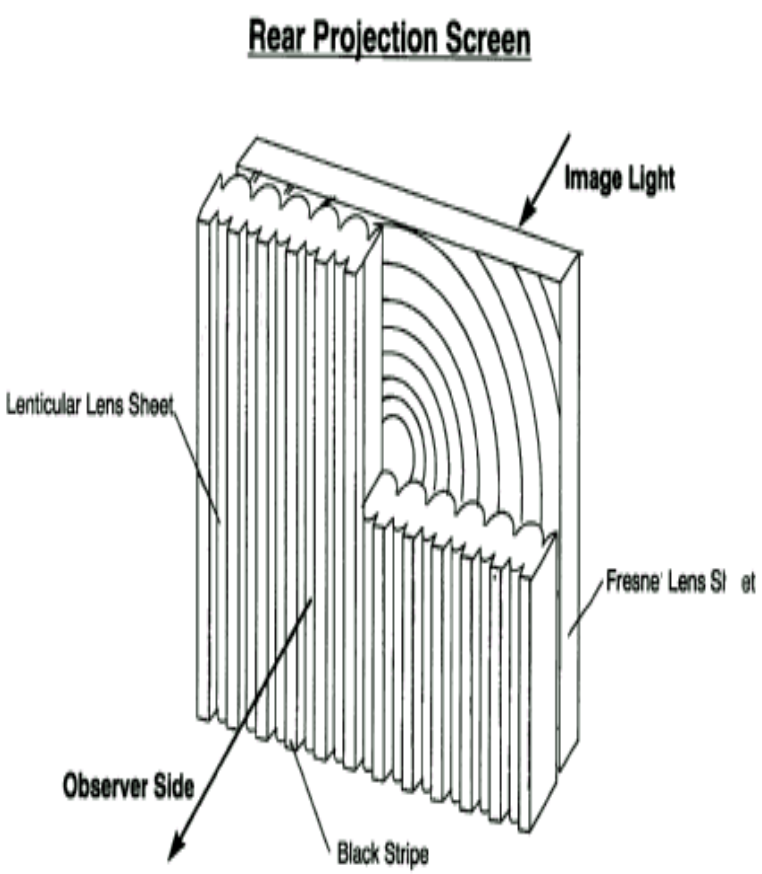
- Fresnel : It sets a focal point of light emitted by CRT
- Lenticular : It adjusts a light through Fresnel to be suitable for viewers

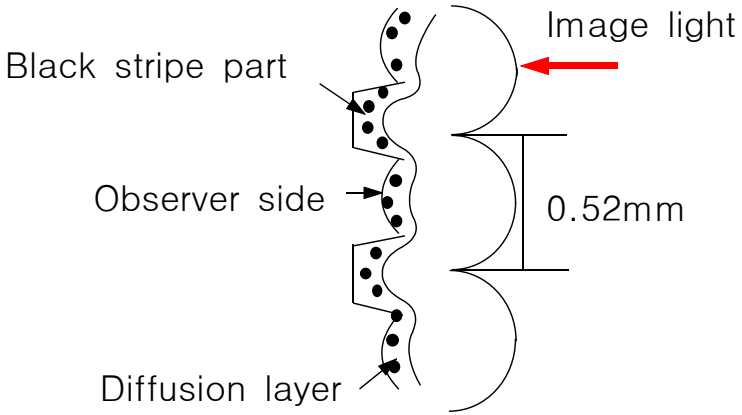
- Pitch : There are bulged stripes on a Screen. A pitch refers to the stripe interval composed of a observer side and the rest covered in black to block out a light.
  In other words, the section transmits out a visible light.
- Black Stripe : The rest of part abovementioned blocks out other light(Fluorescent light, Sunlight), instead of one from CRT.
- Dispersing Agent(TINT: Black dots in the picture) :
  Since a light travels in a straight line, an image is to be visible on a screen from only one direction the front without dispersing agent.
  However, a dispersing agent enables it to be visible from all directions. (Up, Down, Left and Right)
- Gain : It explains an image brightness observed from the front direction numerically.
- Horizontal/Vertical vision angle : It explains an image brightness observed from all directions (Left/Right or Up/Down) numerical respectively by angle.

- Sun Screen : Flat Panel is installed at the front of screen. It protects the screen, improve contrast and prevents static electricity.
  Its texture is as good as that of a common CRT employed if needed.
  [Material : A hard coating processed PMMA (Tender one of acrylics) at 4H~6H.]

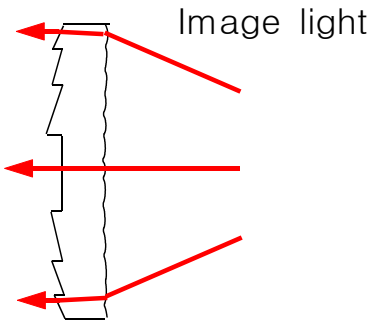
Screen Construction

▶ Screen Assembly and Operation Theory





LENTICULAR



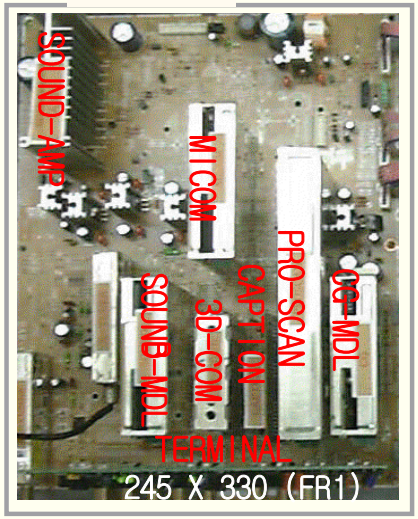
FRESNEL

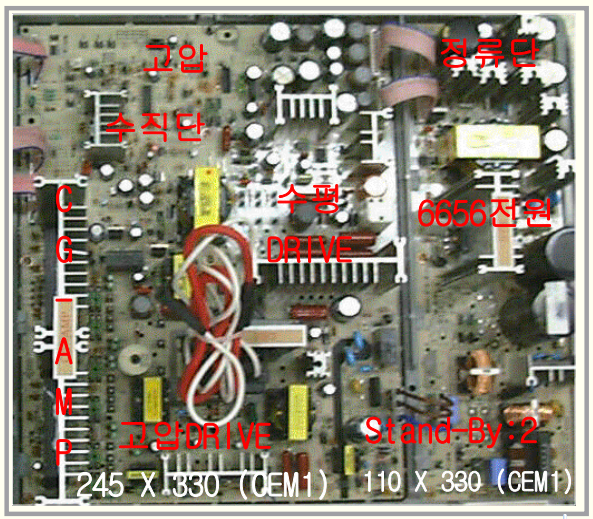
2. J54A Model Specifications

MODEL	SP43T6HP	SP43T7HF	REMARKS
System	CS : PAL Multi	CS : PAL Multi	PAL,SECAM-B/G,D/K,I NT4.43, NT3.58
Display Device	7" CRT * 3	7" CRT * 3	R/G/B
Sun Screen	Anti-Glare	Anti-Glare	Option
Color Temperature	5 Mode	5 Mode	Normal/Cool1/Cool2/ Warm1/Warm2
Dolby Sound	Virtual	Prologic	-
Audio Output	15W * 2	15W*2 + S + C	S:Surround C:Center
2 Tuner PiP	0	0	-
Double Window	X	0	Multi PiP
Teletext	0	0	
Aspect Ratio	4 Mode	4 Mode	Normal/DVD/ZOOM/CINEMA (Wide: 6 Mode)
Picture Mode	4 Mode	4 Mode	Standard/Movie/ Custom/Dynamic
Sound Mode	5 Mode	5 Mode	Custom/Standard/Music/ Movie/Speech
Melody On/Off	0	0	-
Still Picture	0	0	-
S-Video Input	Front-1 / Rear-1	Front-1 / Rear-1	-
AV Input	Front-1 / Rear-3	Front-1 / Rear-3	-
Monitor Output	Rear-1	Rear-1	RCA Jack
TV Output	Rear-1	Rear-1	Scart Jack
DVD Input	Rear-1	Rear-1	-

3. J52A Shark vs J54A Commando

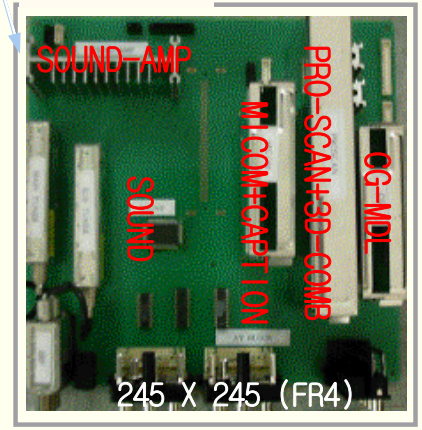
Shark

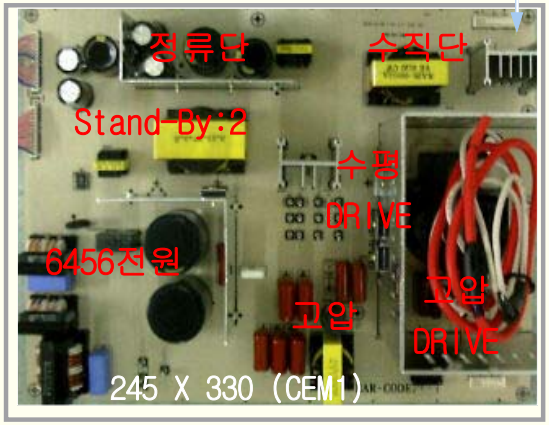




	Shark	Commando
Space	3,584 ㎡	2,638 ㎡
Wire	3,780 cm	3,050 cm
Parts	3,376 EA	2,553 EA
Remark	245*330 (FR-1) 245*330 (CEM-1) 100*330 (CEM-1)	245*245 (FR-4) 245*330 (CEM-1)

Commando

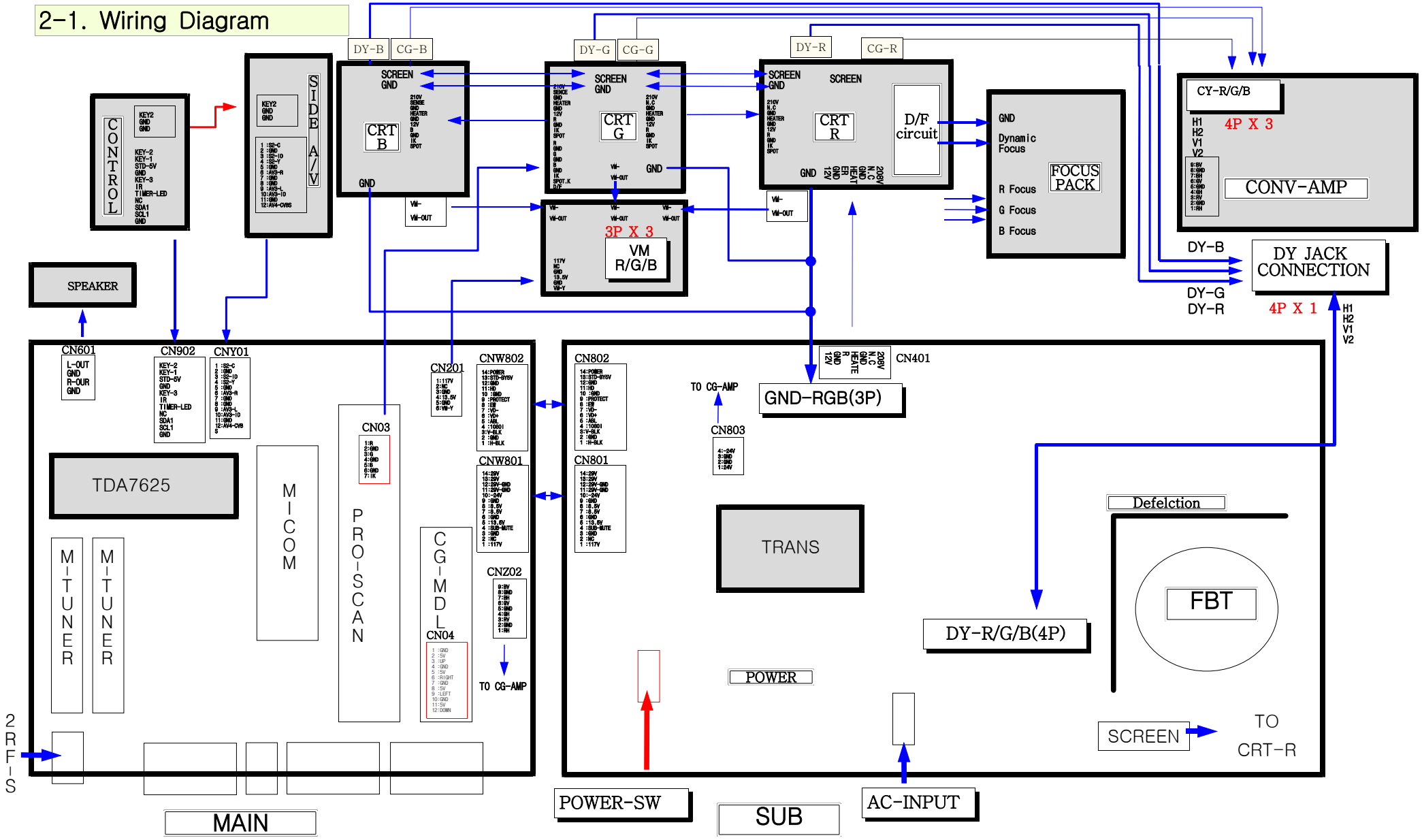




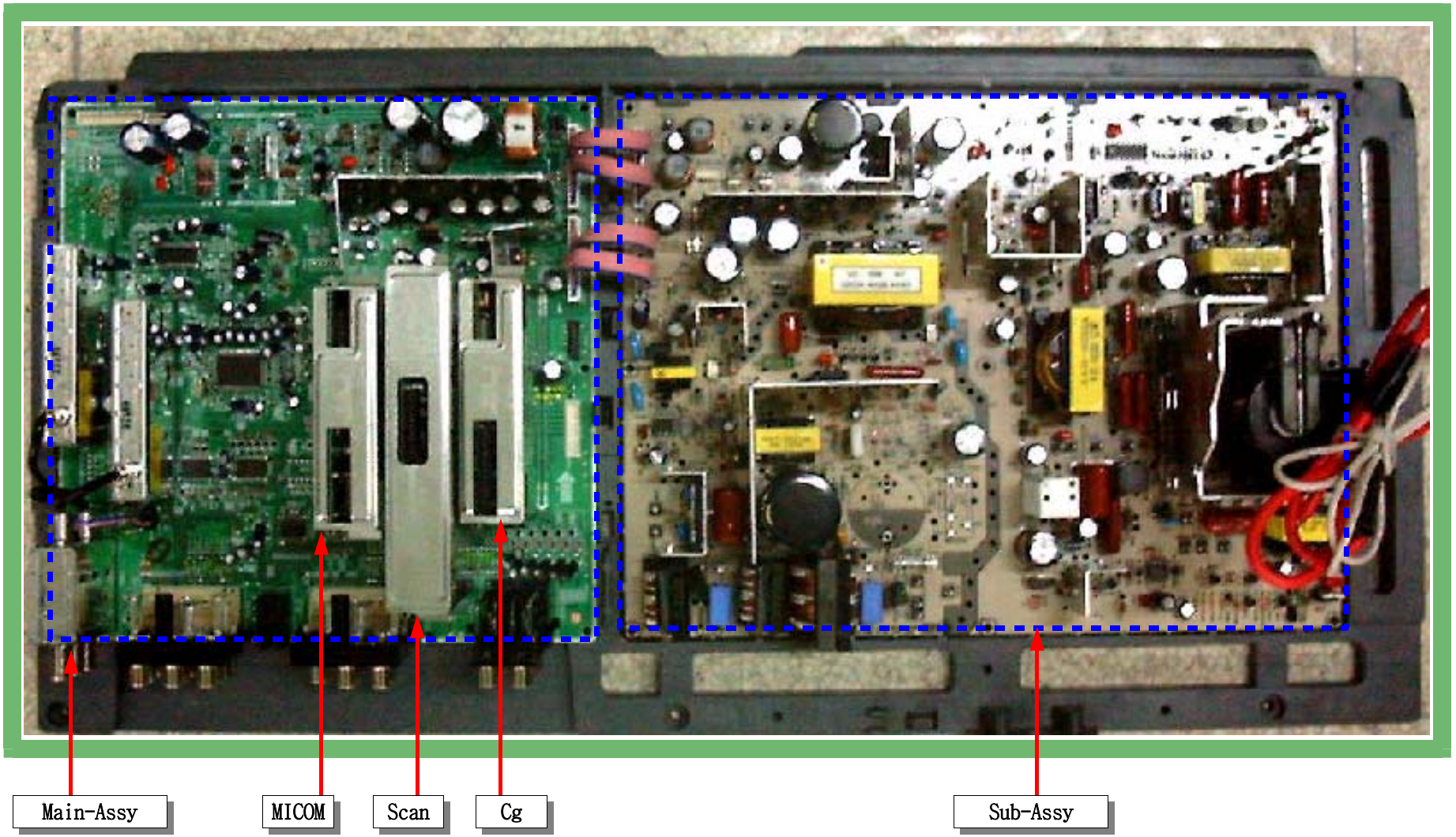
Space : 36 % Slim
Wire : 24 % Short
Parts : 32 % Simple

4. Block Diagram

2-1. Wiring Diagram

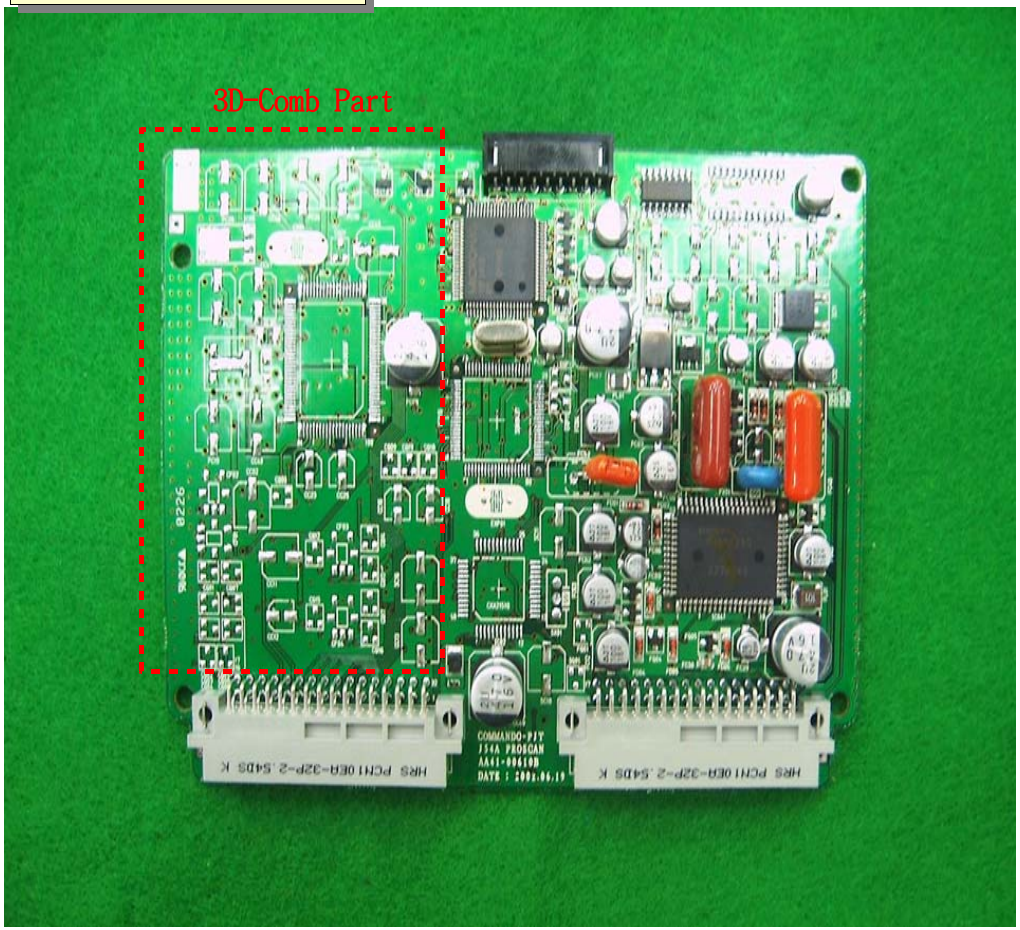


2-2. Assy-Chassis



2-3. SuB-Module

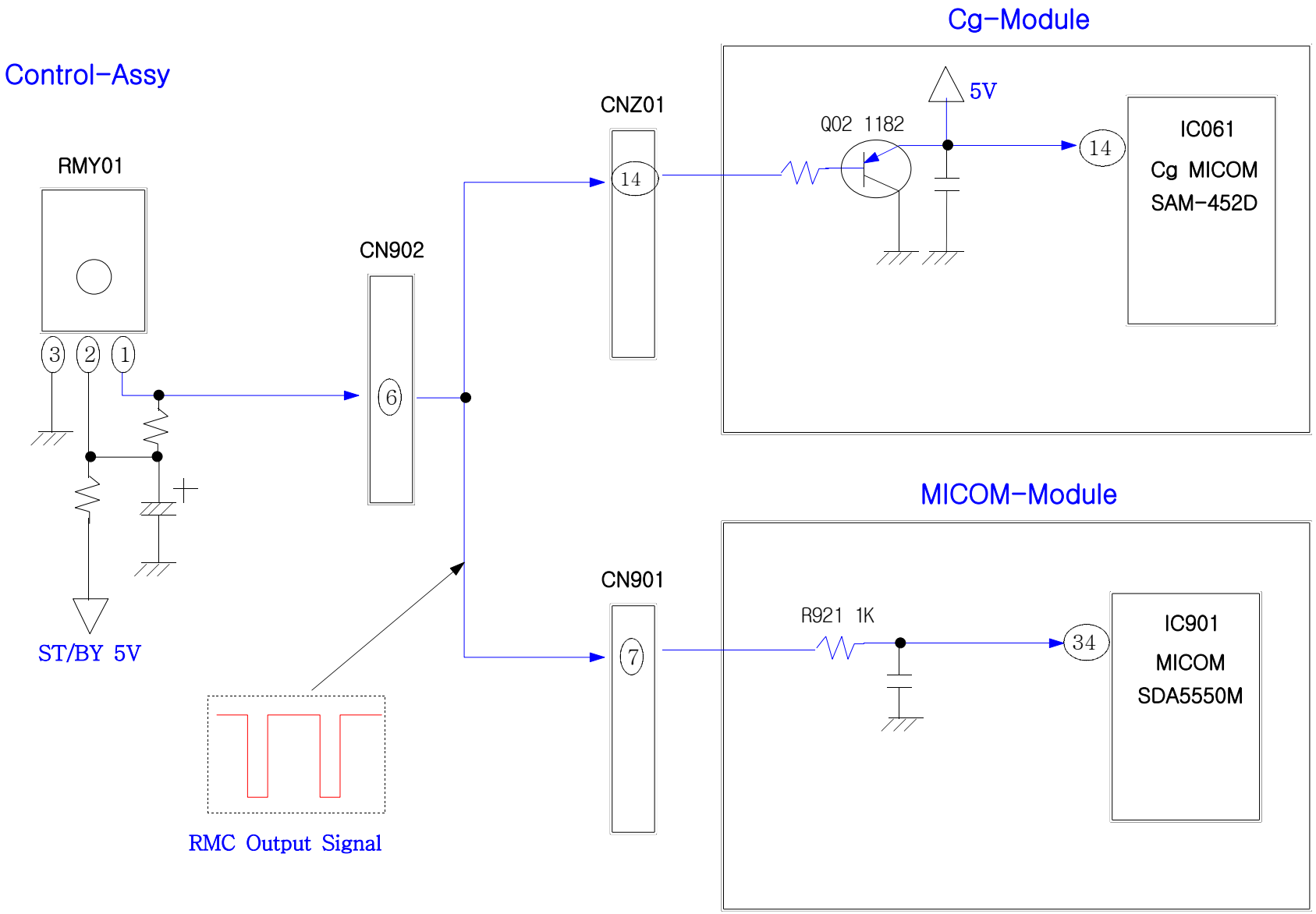
Scan-Module



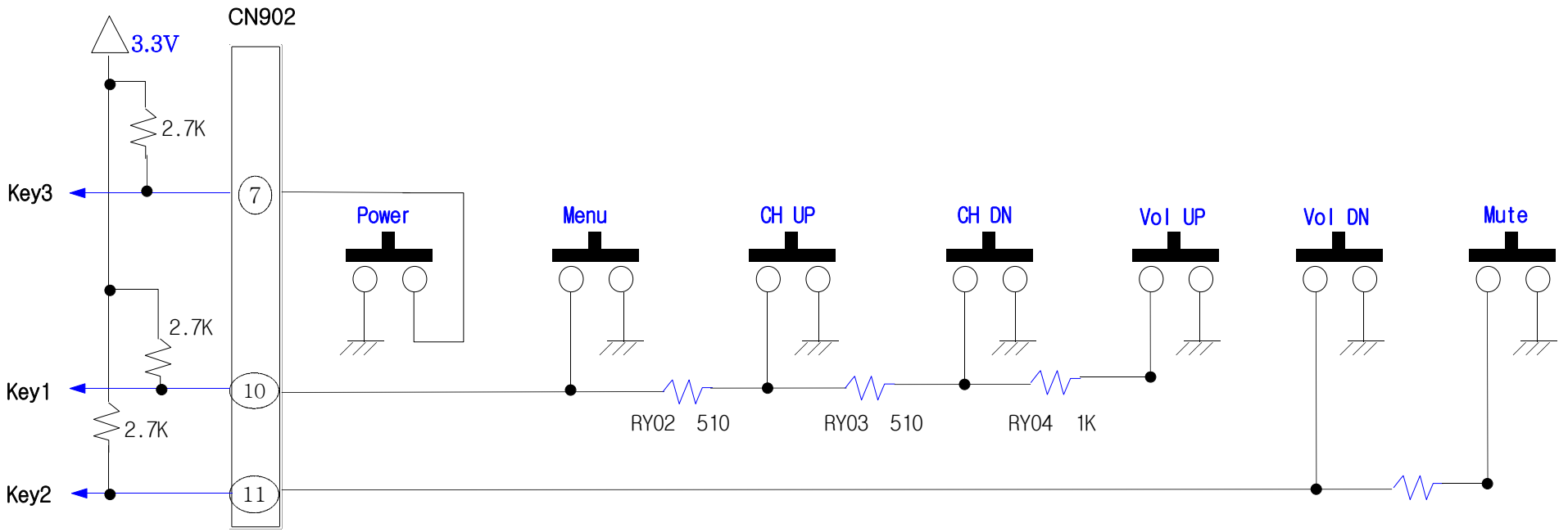
MICOM-Module

Cg-Module

2-4. IR Block Diagram



2-5. Key-Scan Diagram

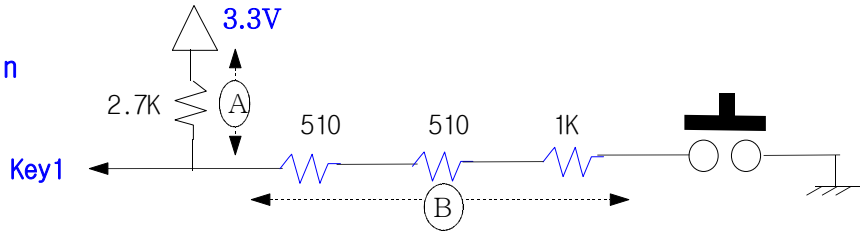


[Key-Scan Voltage]

key	Power	Menu	CH Up	CH Down	Vol Up	Vol Down	Mute	TV/Video
K1	-	0 V	0.53V	0.91V	1.41V	-		
K2	-	-	-	-	-	0 V	0.52V	1.0V
K3	0 V	-	-	-	-	-	-	-

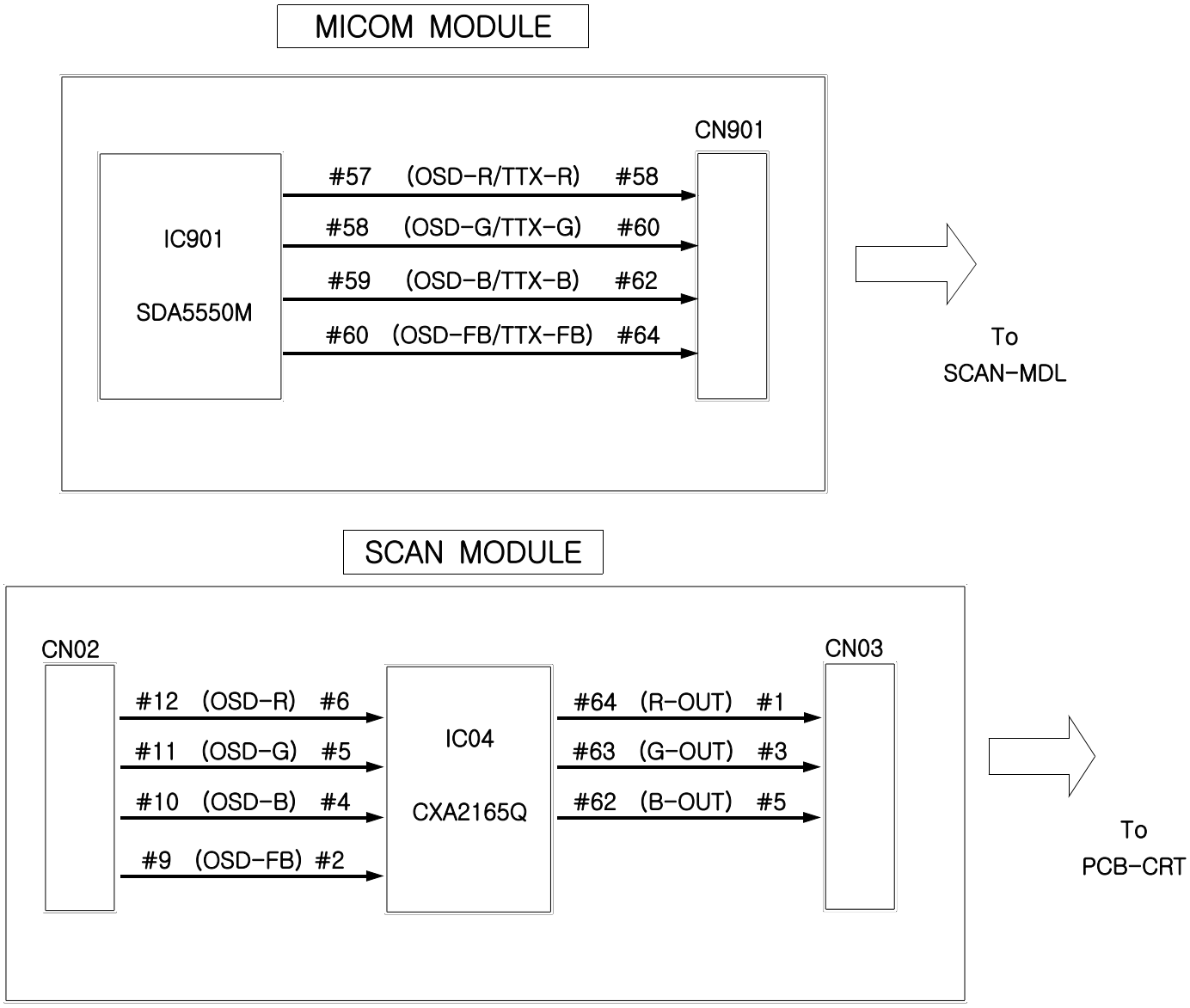
[Key-Scan Voltage divide]

▶Example) Volume-Up Key-in

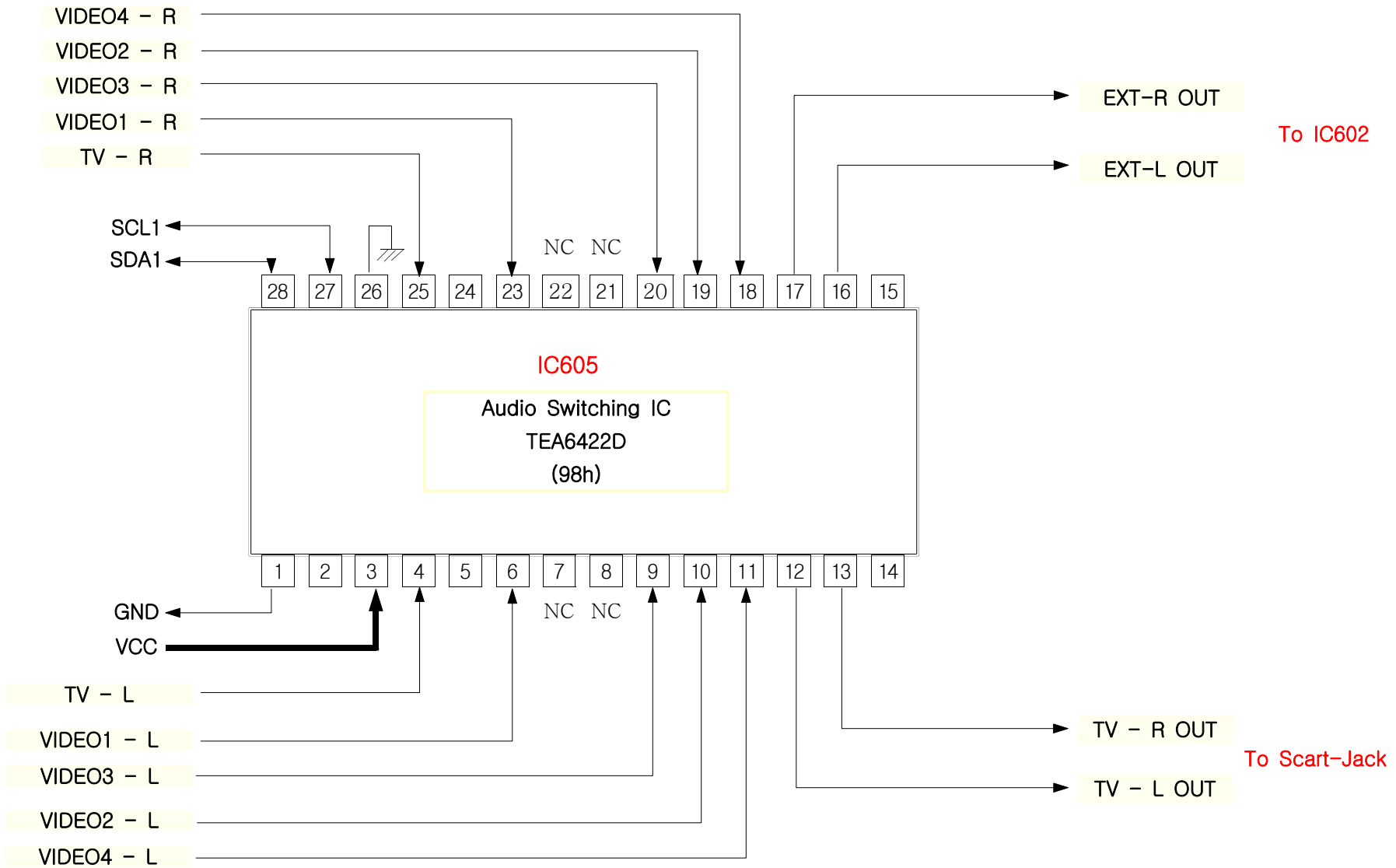


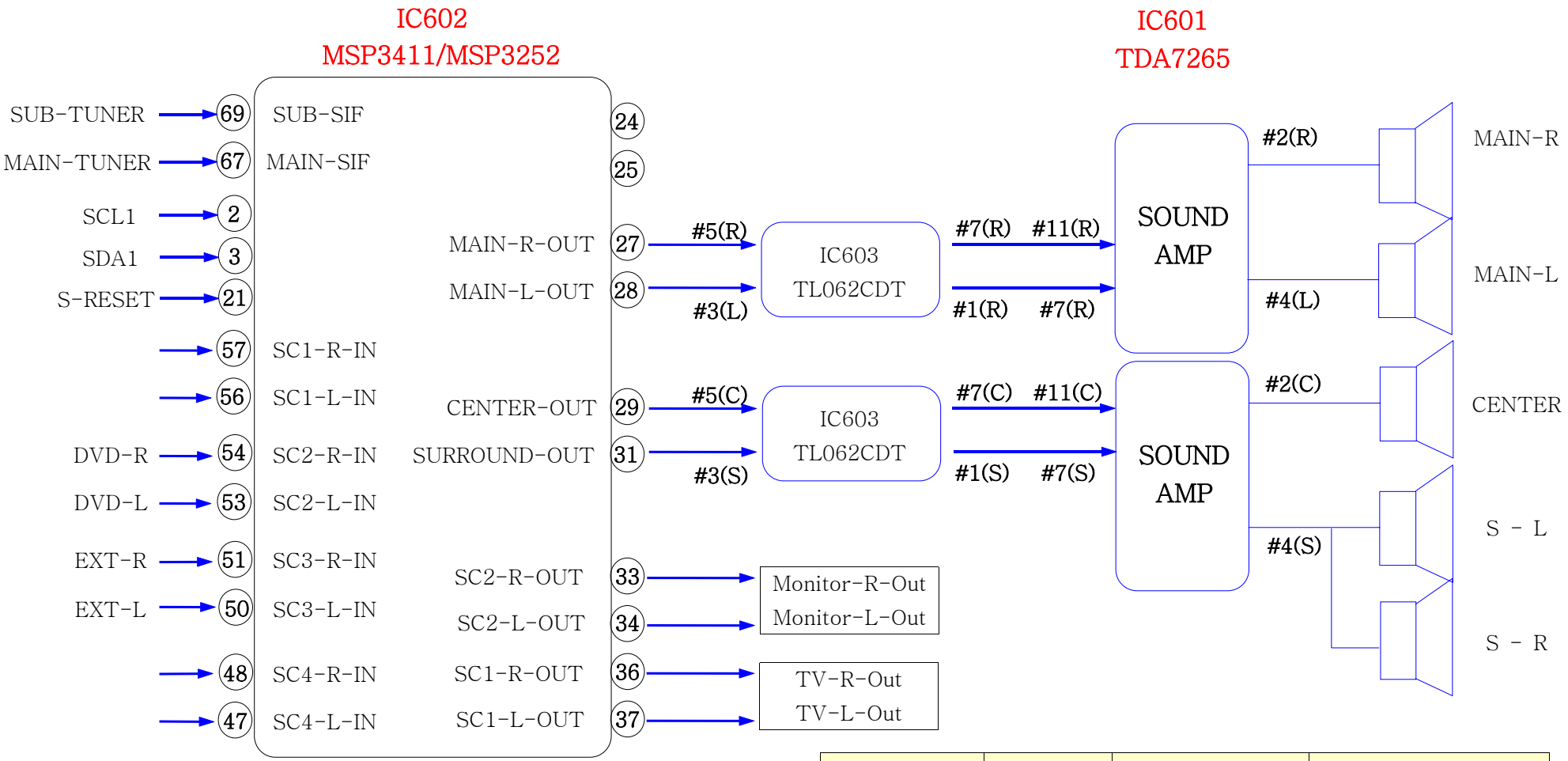
$$\frac{RB * 3.3V}{RA + RB} = \frac{2.02K * 3.3}{2.7K + 2.02K} = 1.41V$$

2-6. OSD Block Diagram



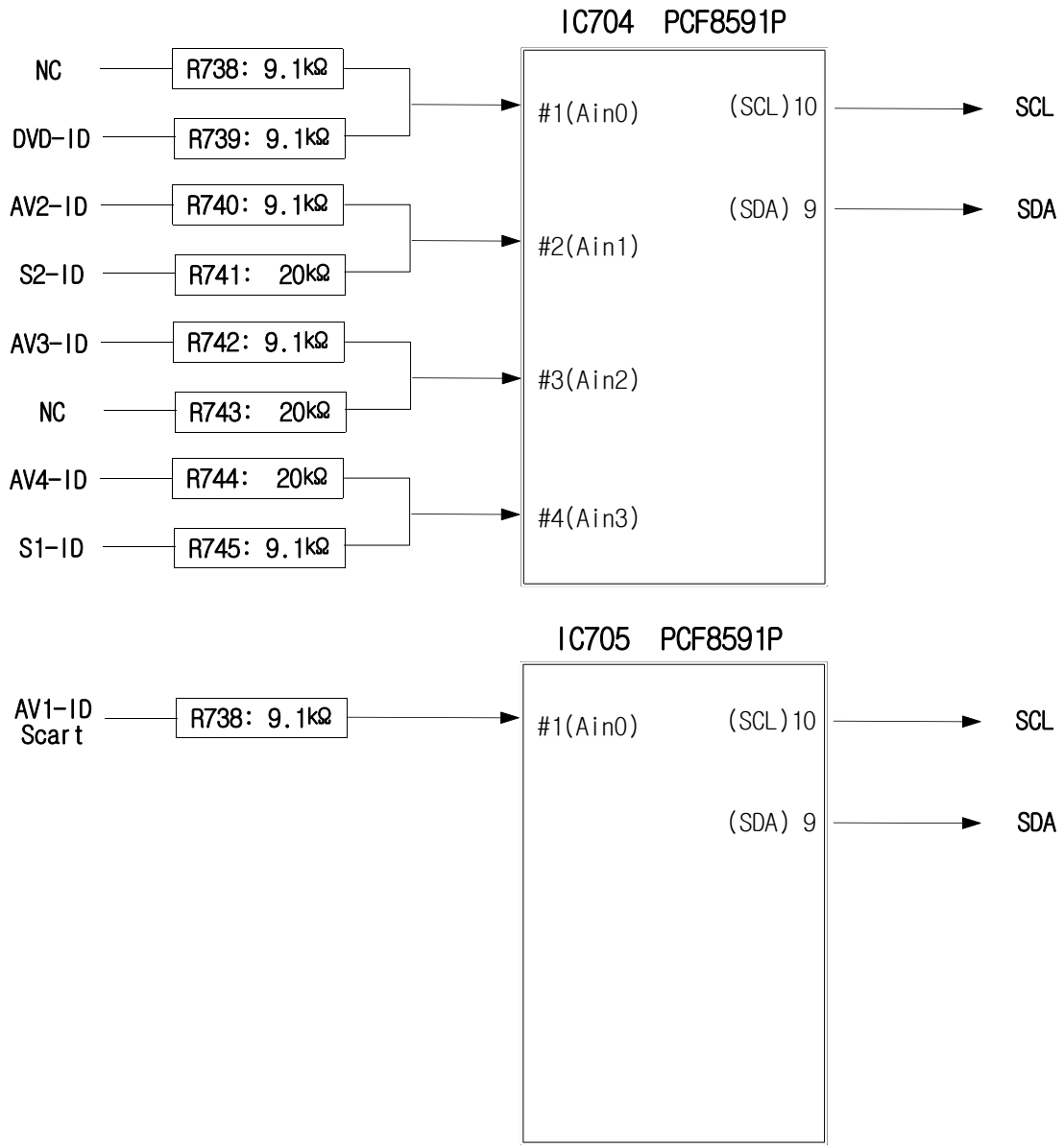
2-7. SOUND SWITCHING Block Diagram





IC Spec	Chassis	Function	Remark
MSP3452G-A2	P54A	Dolby+Stereo	Old Version
MSP3452G-B3	P54A, P55A, J54A	**Dolby+Stereo**	New Version *P55A/J54A
MSP3450G	P54A	Without Dolby	
MSP3411G	J54A	Virtual	*J54A

2-8. JACK IDENT Block Diagram



◆. JACK IDENT OPTION

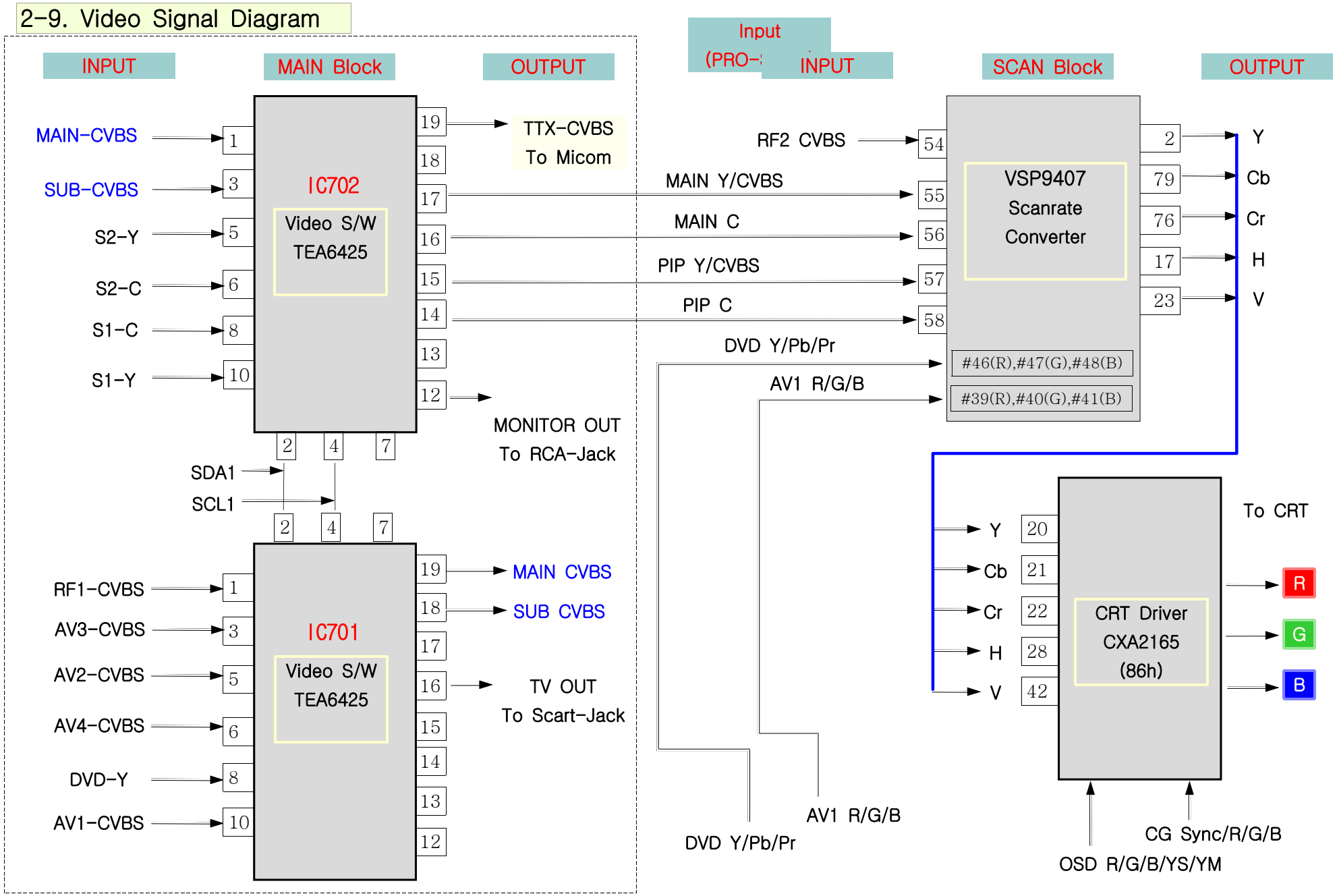
◆. PCF8591P INPUT STEP

STEP	I	II	III	IV
Input Voltage	0 ~ 1.96	1.97 ~ 2.45	2.46 ~ 3.43	3.44 ~ 4.9

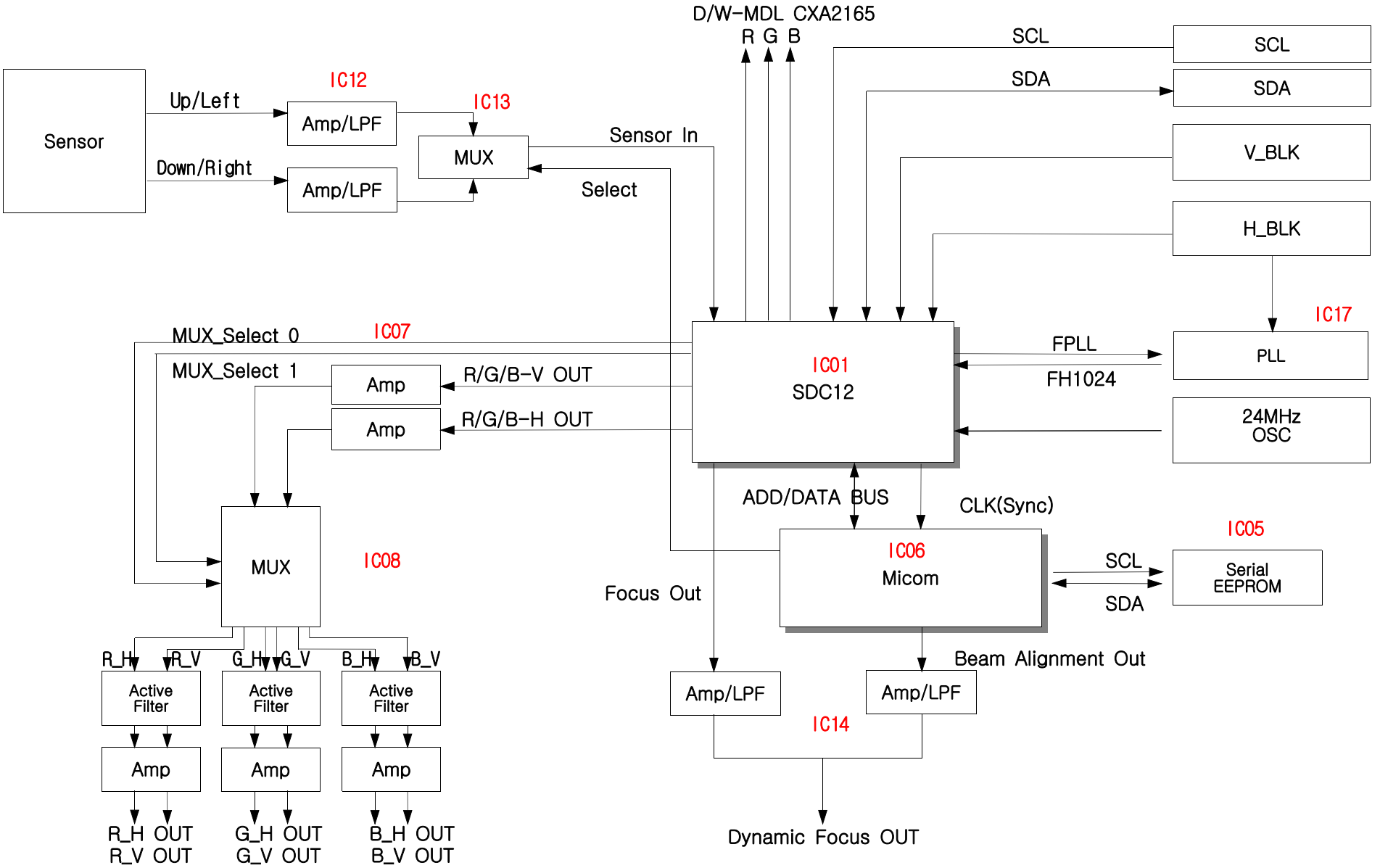
◆. PCF8591P (IC704) INPUT (RCA JACK OPTION)

PIN NO	Function	LOC.	Spec	Operation Voltage		
				Separate Conector	With Jack (All)	With Out Jack
#1	NC	R738	9.1kΩ	-	4.10V (Ⅳ)	2.13V (Ⅱ)
Ain 0	DVD	R739	9.1kΩ	4.07V (Ⅳ)		
#2	AV2	R740	9.1kΩ	2.15V (Ⅱ)	4.09V (Ⅳ)	1.76V (Ⅰ)
Ain 1	SVHS-2	R741	20kΩ	2.88V (Ⅲ)		
#3	AV3	R742	9.1kΩ	4.07V (Ⅳ)	4.09V (Ⅳ)	2.13V (Ⅱ)
Ain 2	NC	R743	20kΩ	-		
#4	AV4	R744	20kΩ	4.07V (Ⅳ)	2.13V (Ⅱ)	2.89V (Ⅲ)
Ain 3	SVHS-1	R745	9.1kΩ	1.76V (Ⅰ)		

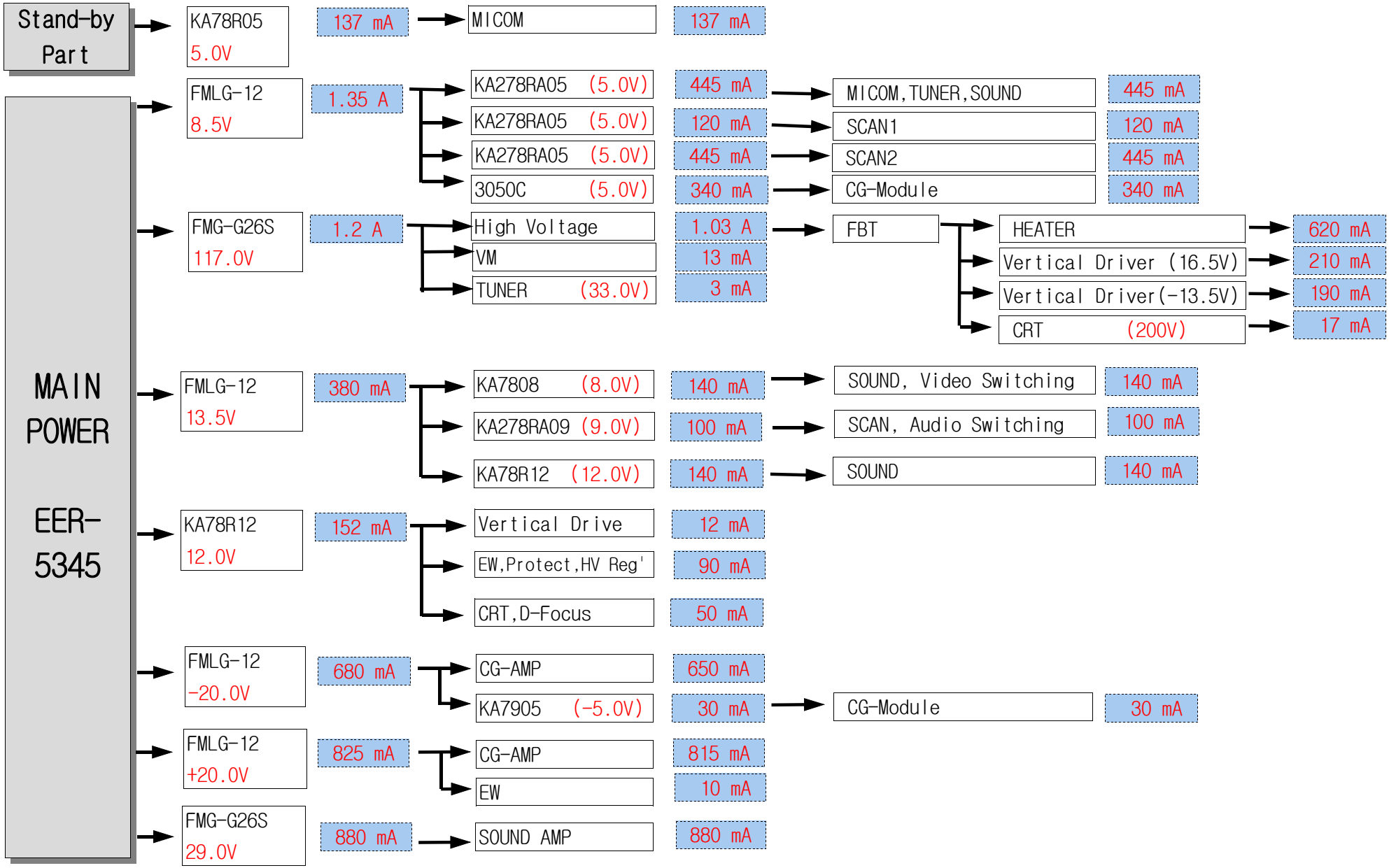
2-9. Video Signal Diagram



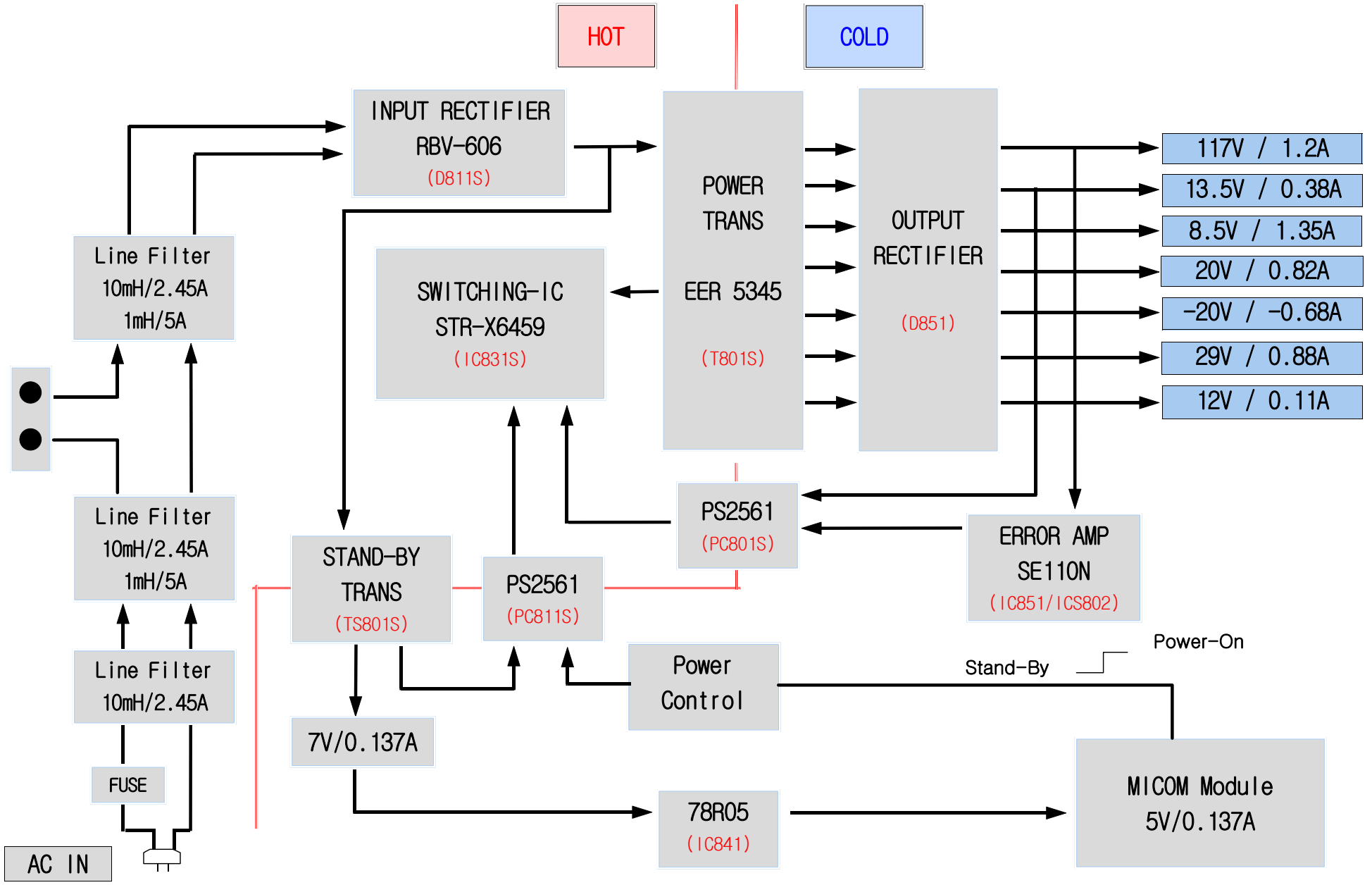
2-10. CONVERGENCE Module Block Diagram



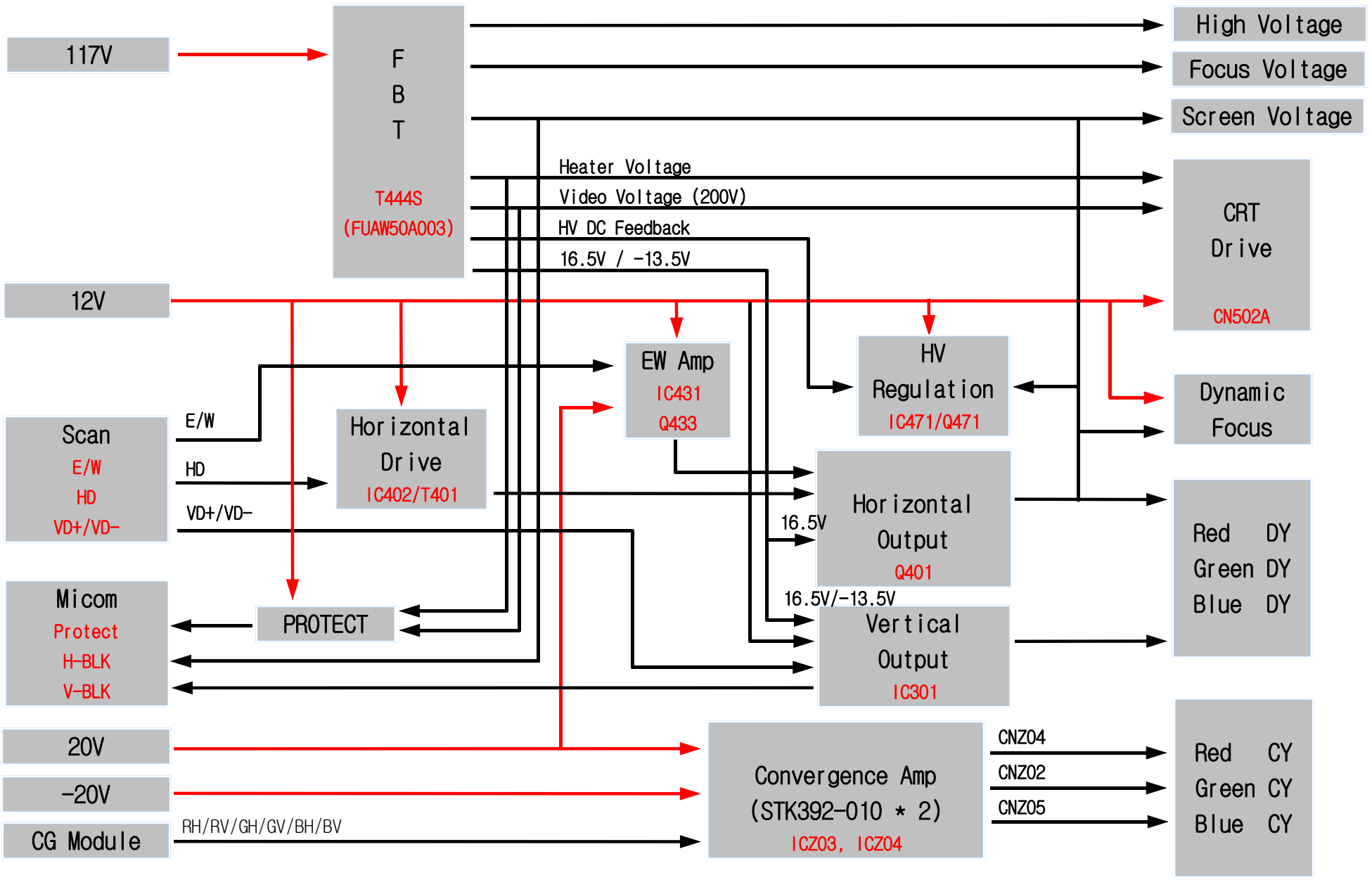
2-11. Current System



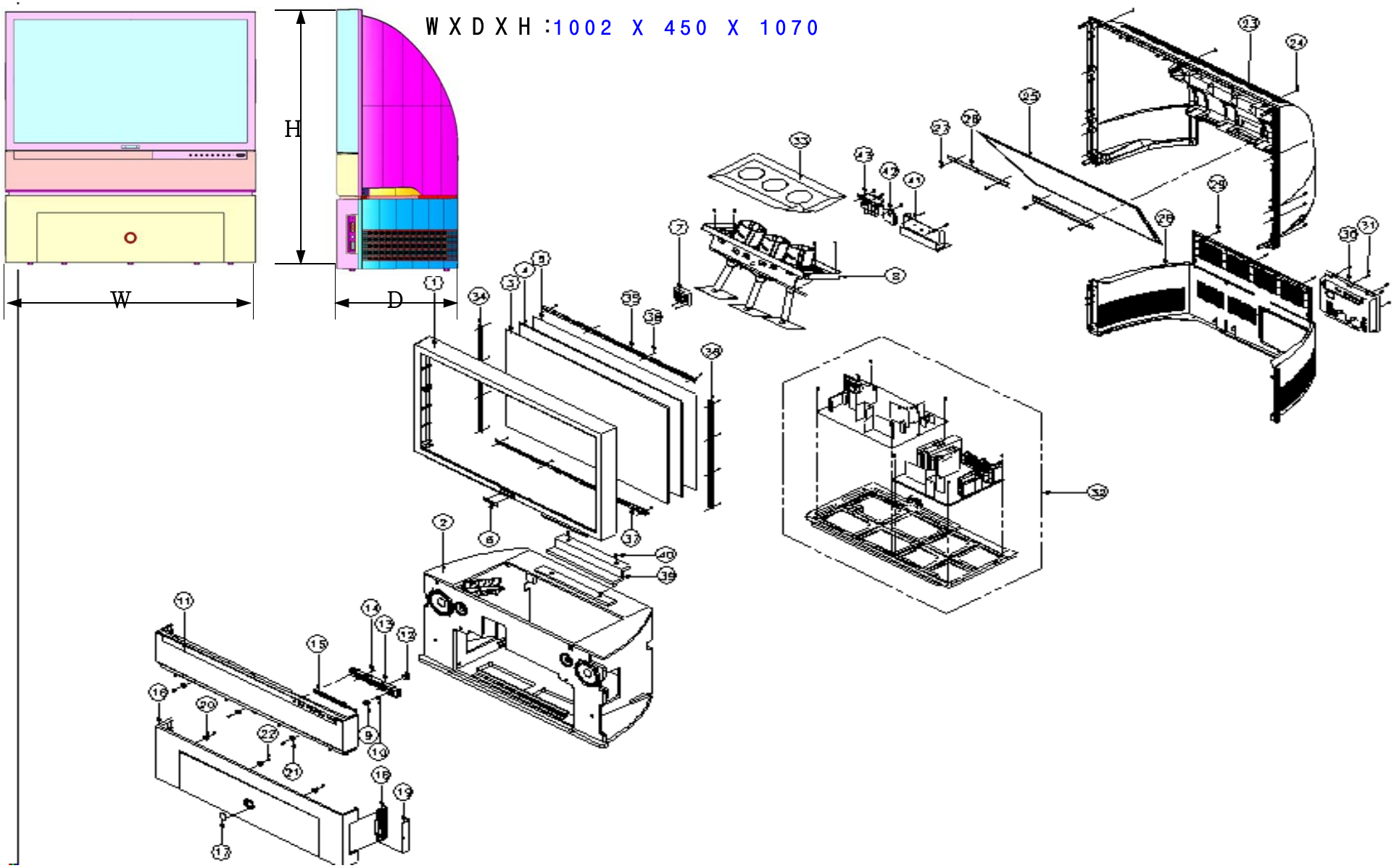
2-12. Power Supply System



2-13. Deflection System



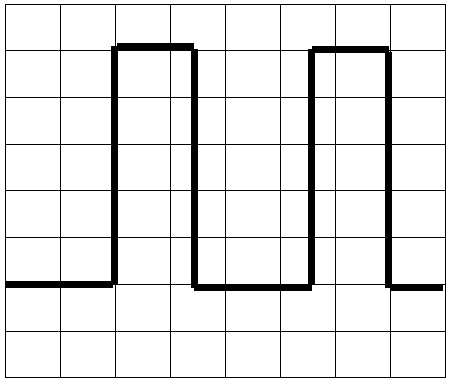
5. PJTV Exploded View

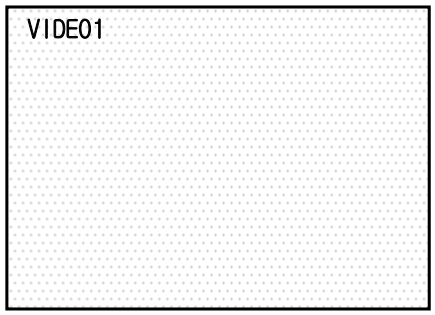


6. Adjustments & Inspections

4-1.Screen Voltage Adjustment

< Before adjustment >

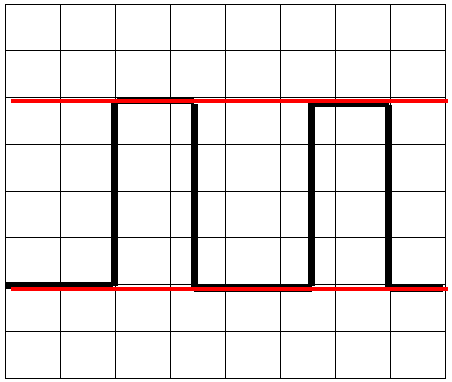




1.Press TV/VIDEO key to switch to VIDEO-1 after switching to Aging-Mode.

*Jack-jig is not necessary at Aging-Mode

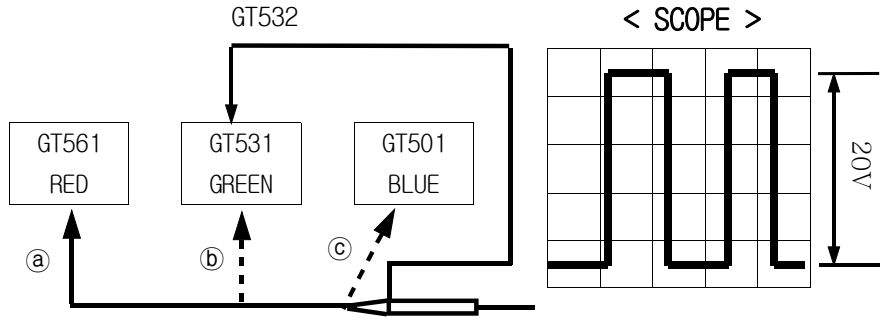
< After adjustment >



RED	GREEN	BLUE
VR561	VR531	VR501

3. Set the size of "ⓓ(SYNC LEVEL)" at the left waveform to AC20Vp-p by varying the VR of ASSY-CRT,R/G/B.

★ ⓓ : AC20Vp-p ± 2V



2. Connect the scope probe for the screen voltage adjustment to GT532 of PCB-CRT,G.

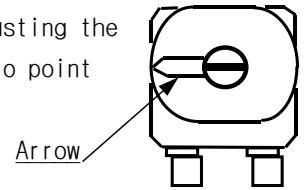
1) The above step may be changed by the step 1 at the left.

2) The screen should be black (NO-VIDEO) when selecting the video mode.

3) When adjusting the screen voltage, the order(ⓐ,ⓑ,ⓒ) may be changed.

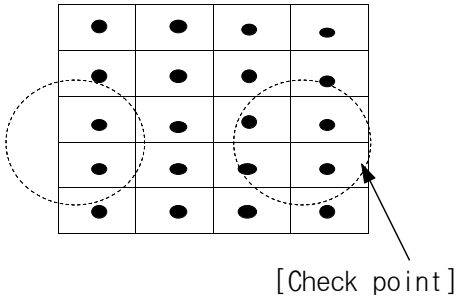
4. When the adjustment is completed, disconnect the probe for the adjustment from ASSY-PCB,CRT.

★ Set the VR position before adjusting the screen after adjusting the arrow to point to 9 0'clock

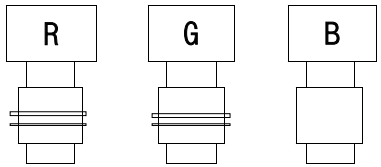


4-2. Beam alignment Adjustments

< Adjustment pattern:
Cg adjustment Mode>

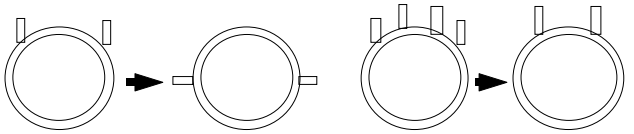


< Adjustment CRT: R,G >

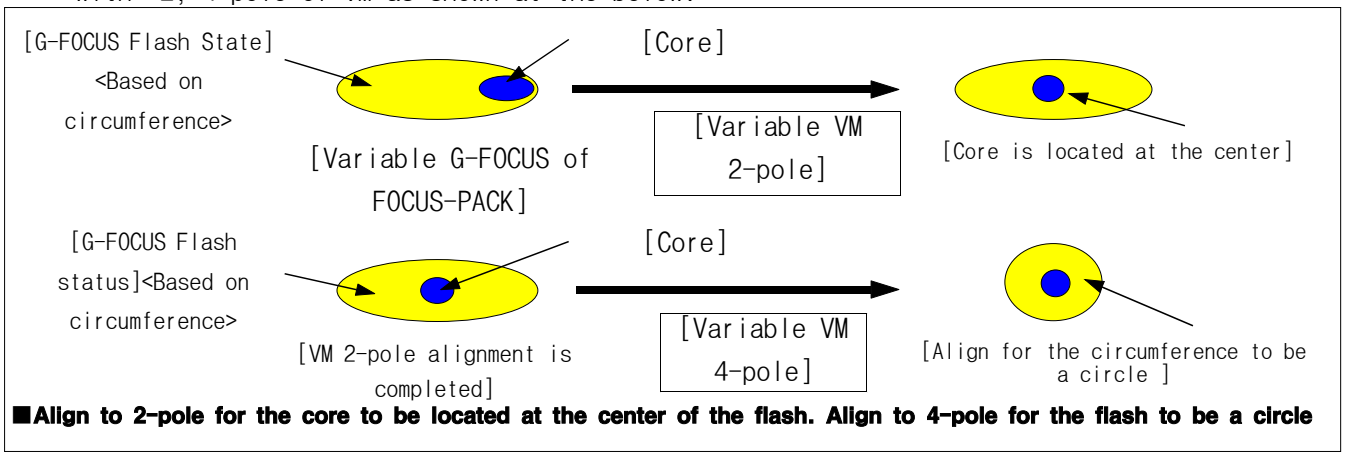


1. Adjustment procedure and method

1) Enter into Cg adjustment mode.
2) Adjust Beam-Alignment to set CY ZERO magnetic field range
3) Press ⑦ button of the transmitter for one second to switch to Beam alignment mode.



4) Perform defocusing by displaying GRN-CRT only and then varying Focus VR, and adjust with 2, 4 pole of VM as shown at the below.



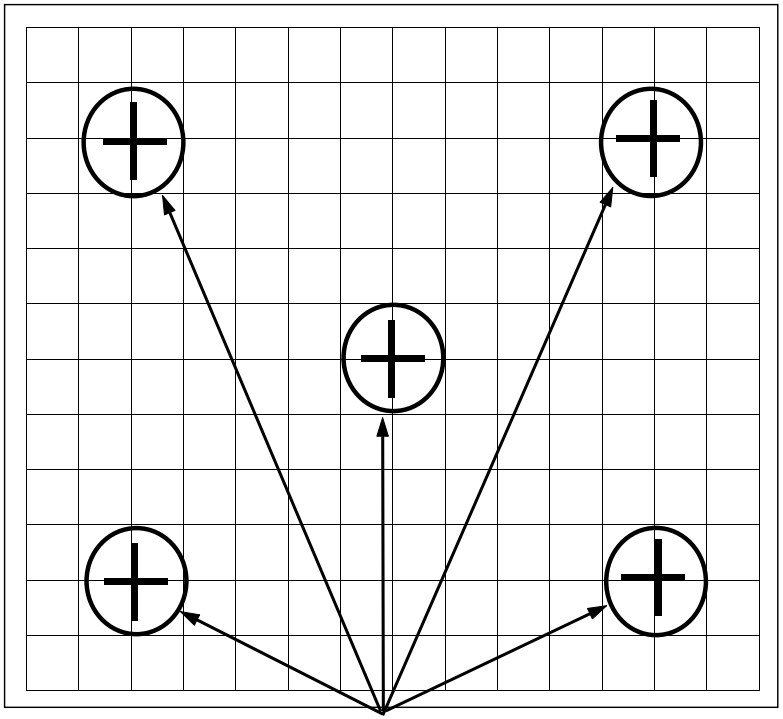
■Align to 2-pole for the core to be located at the center of the flash. Align to 4-pole for the flash to be a circle

5) Align G-FOCUS for the surrounding flash to be disappeared from the spot.
6) After displaying RED-CRT only, align with 2 and 4 poles of the VM same as GRN-CRT.
   ▶ Because B-CRT has a small degree of the focus change according to the beam change, the alignment is deleted.(VM-Coil Only mounted)
7) After Beam-Alignment, press PIP button to deselect the beam alignment mode.
8) After completing the alignment, lock the VM of R,G-CRT.

4-3.Static/Lens Focus Adjustment

MODEL	Whole PJTV model
CHASSIS	Whole PJTV model

STATIC-FOCUS Adjustment method

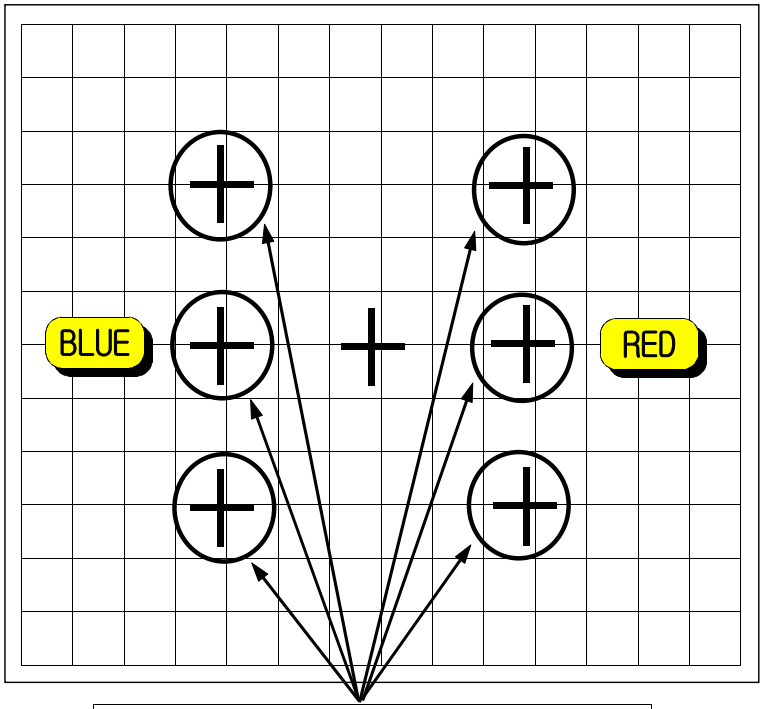


Adjust the top/bottom/left/right focus to equal and optimized state.

NO	Adjustment procedure	Management standard
1	Perform a sufficient aging on the adjustment set. (supply ANT connection and rated power)	SET rated power 70 ~ 90dB
2	Selectively receive the CROSS HATCH pattern by the channel selection button.	CROSS HATCH
3	Mute colors except adjusted ones by entering into Cg-Mode. -. Adjust the focus by checking both Cg pattern and RF pattern together.	Display adjusted colors
4	After display RED, adjust "R-VR" of FOCUS-PACK to the variable center ↔ the circumference focus to the optimized state.	FOCUS should be properly adjusted
5	After display GREEN, adjust "G-VR" of FOCUS-PACK to the variable center ↔ the circumference focus to the optimized state.	FOCUS should be properly adjusted
6	After display BLUE, adjust "B-VR" of FOCUS-PACK to the variable center ↔ the circumference focus to the optimized state.	FOCUS should be properly adjusted
7	Adjust to the optimized state parallel with LENS-FOCUS.	

MODEL	Whole PJTV model
CHASSIS	Whole PJTV model

LENS-FOCUS Adjustment method



Set the optimized state just before chromatism starts to change within ±3 grids at the horizontal center

NO	Adjustment procedure	Management standard
1	Perform a sufficient aging on the adjustment set. (supply ANT connection and rated power)	SET rated power 70 ~ 90dB
2	Receive the CROSS HATCH pattern.	CROSS HATCH
3	Mute colors except adjusted ones by entering into Cg-Mode.	Display adjusted colors
4	Adjust the lens focus by observing the chromatism between the center and the circumference of the pattern.	

1) Chromatism change when turning the lens at the clockwise

LENS	Chromatism
RED	ORANGE → CRIMSON
GREEN	BLUE → RED
BLUE	PURPLE → GREEN

RED:CRIMSON
GREEN : RED
BLUE : GREEN

2)GREEN-LENS adjustment

① Adjust just before the chromatism starts to change from blue to red.

②If the chromatism is not even over the whole screen, adjust it for a small amount (1~3mm) of red chromatism to appear at 3/5 outside from the screen center.

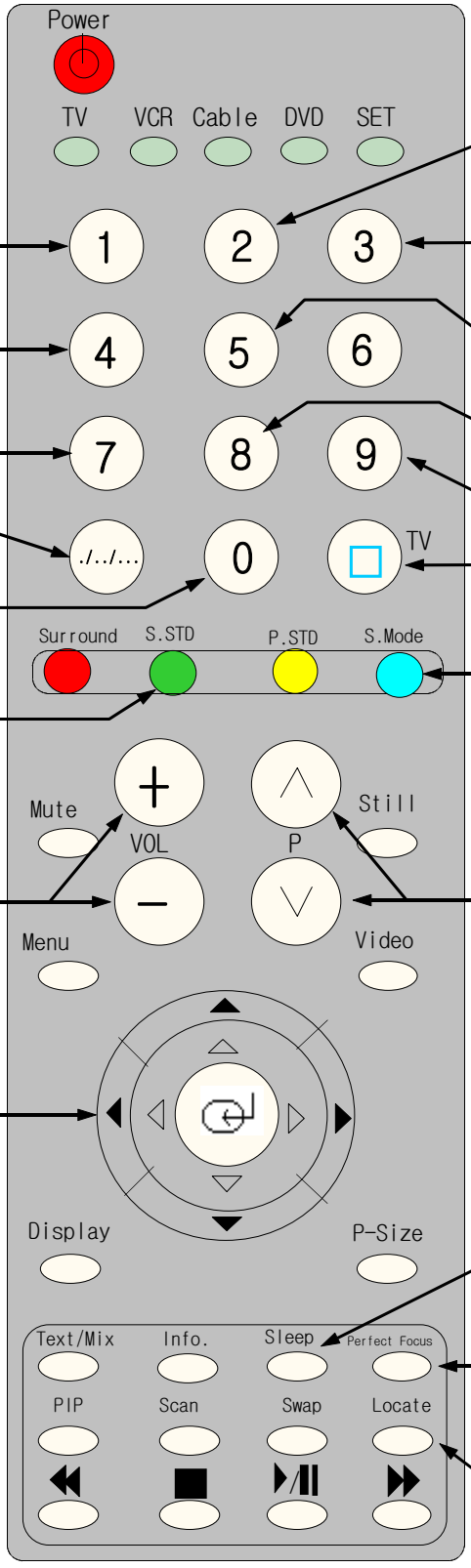
1. PJ-TV [Cg Initial Data Call] Spec

*Note; Classifying by chassis is done at the initial derivation time-->Now, it is applied without classifying by chassis
*** The below table is subject to be changed when a device series or a chassis stops to be manufactured**

Chassis name	Inch (series)	Major model	How to extract basic data: Number entered after entering into Cg-Mode	Screen display type	Displayed contents
P54A P55A	54"(54J9)	PCL545R	5-545	+ + + + +	
	62"(62J9)	PCL6215R	5-625	+ + + + + +	
	54"(54J9)	PCL545R	5-546	+ + + + +	Reset basic data when applying Sanyo DV
	62"(62J9)	PCL6215R	5-626	+ + + + + +	
	55"(552W)	HCL552W	5-552	⬭ ⬭ ⬭ ⬭ ⬭	Displaying "0" to differentiate inch & series
	65"(652W)	HCL652W	5-652	⬭ ⬭ ⬭ ⬭ ⬭ ⬭	
	43"(43T6)	SVP-43T6	5-435	+ + + +	Displaying "+" to differentiate inch & series
	48"(48T6)	SVP-48T6	5-485	+ + + + + + + +	
	42"(42W5)	SVP-42W5	5-425	▭ ▭ ▭ ▭	Displaying "□" to differentiate inch & series W3 and Q7 of 47" have the same Data-Call
	47"(47W3) (47Q7)	SVP-47W3 SVP-47Q7	5-473	□ □ □ □	
	47"(47W1)	HCL4715W	5-473	□ □ □ □	
	55"(55W3)	SVP-55W3	5-553	□ □ □ □ □	
	65"(65W3)	SVP-65W3	5-653	□ □ □ □ □ □	
	52"(52Q7)	SVP-52Q7HR	5-521	+ + + + +	Created on 11/19/02
	43"(43W6)	SVP-43W6HR	5-431	+ + + +	436-overlapping is excluded

2. Remocon Key for Cg adjustment

■ The adjustment mode is activated by entering the following sequence ;
MUTE → 1 → 8 → 3



Convergence data reset

Select Line/Entire/Normal-Mode

Select RED color adjustment

Mute RED color

Mute GREEN color

Exit to RF-Mode

Convergence horizontal data control (Left and Right)

Press to move the cursor Up, Down, Left and Right

Press to RF-Mode or CG-Model select

CG-Pattern move to right

Press to call the convergence initial data

Return to the initial values during CG adjustment

Convergence initial data recall for each models

Select GREEN color adjustment

Select BLUE color adjustment

Mute BLUE color

Convergence adjustment data save

Convergence vertical data control (Up and Down)

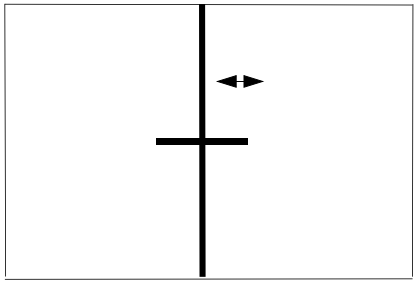
CG-Pattern move to left

Press to Factory-Scan after completing the CG adjustment

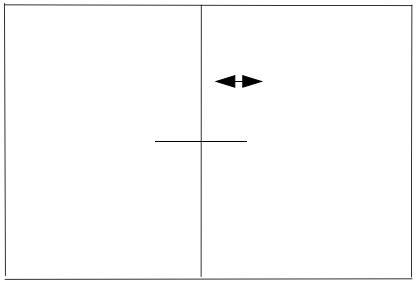
Press to CG adjustment data copy from PAL to ntsc

3. Factory scan (Auto Color)

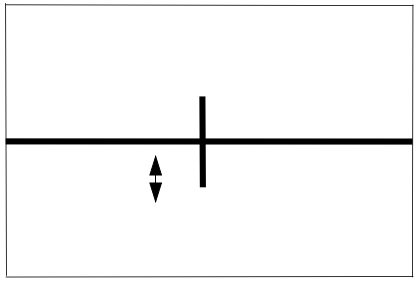
1



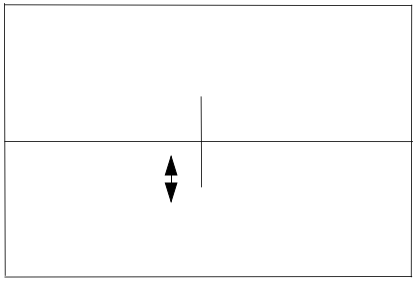
2



3



4



After completing the convergence adjustment, the basic setting for operating Auto Color function should be done by pressing Auto Color key.
The above 1-4 screen appears with the sequence of Green/Red/Blue to perform each function.
If it normally exits, it returns to Convergence Adjustment mode.
If any error occurs, it repeats the function once. And then, if it is found to have an error finally, Full White Pattern is displayed. (The entire screen turns to be white)
In this case, pressing any key returns to Convergence adjustment screen.

Micom Factory-Data

[Deflection]-PAL Mode

Item	Range	Initial Data	Adjust	EEP-ROM Copy Data		
				43T6HP	43T7HF	Remark
V Amp	0~63	14	Variable	15	44	
V Shift	0~63	31	X	31		
H EW	0~63	35	Variable	20	48	
H Shift	0~63	24	X	24		
V Linearity	0~15	7	X	7		
Upper Linearity	0~15	0	X	0		
Lower Linearity	0~15	0	X	0		
V SC	0~15	2	X	2	7	
H Parabolra	0~63	15	X	15	25	
Upper Corner	0~63	33	X	33	37	
Lower Corner	0~63	33	X	33	33	
H Trapezium	0~63	18	X	18	31	
BOW	0~63	31	X	31		
Angle	0~63	31	X	31		
V Position	0~63	31	X	31		
Up UGC	0~3	0	X	0		
Lo UGC	0~3	0	X	0		
CXA Left Blk	0~63	50	X	50		
CXA Right Blk	0~63	25	X	25		

[Deflection]-NTSC Mode

Item	Range	Initial Data	Adjust	EEP-ROM Copy Data		
				43T6HP	43T7HF	Remark
V Amp	0~63	14	Variable	17	49	
V Shift	0~63	31	Variable	33	34	
H EW	0~63	35	Variable	23	46	
H Shift	0~63	24	Variable	31	32	
V Linearity	0~15	7	X	7		
Upper Linearity	0~15	0	X	0		
Lower Linearity	0~15	0	X	0		
V SC	0~15	2	X	2	7	
H Parabolra	0~63	15	X	15	25	
Upper Corner	0~63	33	X	33	37	
Lower Corner	0~63	33	X	33	33	
H Trapezium	0~63	18	X	18	31	
BOW	0~63	31	X	31		
Angle	0~63	31	X	31		
V Position	0~63	31	X	31		
Up UGC	0~3	0	X	0		
Lo UGC	0~3	0	X	0		
CXA Left Blk	0~63	50	X	50		
CXA Right Blk	0~63	25	X	25		

[Video Adjust1]

Item	Range	Initial Data	Adjust	EEP-ROM Copy Data		
				43T6HP	43T7HF	Remark
R Cutoff	0~63	20	Variable	20		
G Cutoff	0~63	20	Variable	20		
B Cutoff	0~63	20	Variable	20		
COLOR On/Off	0~1	1	X	1		
CR Offset	0~63	31	Variable	31		
CB Offset	0~63	31	Variable	31		
R Drive	0~63	31	Variable	31		
G Drive	0~63	31	Variable	31		
B Drive	0~63	31	Variable	31		
Sub Bright	0~63	20	Variable	20		
Sub Contrast	0~15	8	Variable	8		
Sub Color	0~23	15	X	15		
Sub Tint	0~63	31	X	31		
CTI Level	0~3	1	X	1		
COL AXIS	0~3	2	X	2		
LTI Level	0~3	1	X	1		
VSU	0~15	2	X	2		
Melody Volume	0~20	4	x	4		
LTI Mode	0~3	1	x	1		
System	0~3	1	x	1		

[Video Adjust2]

Item	Range	Initial Data	Adjust	EEP-ROM Copy Data		
				43T6HP	43T7HF	Remark
ABL Mode	0~3	3	X	3		
Gamma	0~3	1	X	1		
DPIC Level	0~3	3	X	3		
DC Trans	0~3	2	X	2		
ABL TH	0~15	15	X	15		
VM Level	0~3	2	X	2		
VM Coring	0~3	0	X	0		
VM f0	0~3	1	X	1		
VM Limit	0~3	1	X	1		
VM Delay	0~3	1	X	1		
SHP CD	0~3	0	X	0		
SHP f0	0~1	1	X	1		
SHP f1 & P/O	0~15	11	X	11		
AKB Time	0~31	13	X	13		
Band pass 9407	0~7	24	X	24		
High pass 9407	0~7	40	X	40		
S ABL	0~3	0	X	0		
P ABL	0~15	15	X	15		

[Video Adjust3]

Item	Range	Initial Data	Adjust	EEP-ROM Copy Data		
				43T6HP	43T7HF	Remark
H Comp	0~15	2	X	2	8	
V Comp	0~15	4	X	4	5	
Pin Comp	0~7	3	X	3	0	
AFC Comp	0~7	0	X	0		
Sync Phase	0~1	0	X	0		
NR off Value	0~9	6	X	6		
CG HAO	0~20	10	X	0	10	
CG VAO	0~20	15	X	10	15	
NR High Ref	0~127	40	X	40		
NR Low Ref	0~127	3	X	3		
NR High Value	0~255	17	X	17		
NR Low Value	0~255	51	X	51		
NR High Ref(S)	0~127	20	X	20		
NR Low Ref(S)	0~127	0	X	0		
NR High Value(S)	0~255	17	X	17		
NR Low Value(S)	0~255	51	X	51		
NR Read M/s	0	0	X	0		

[Video Adjust4]

Item	Range	Initial Data	Adjust	EEP-ROM Copy Data		
				43T6HP	43T7HF	Remark
SECAM Color Main	0~255	28	X	28		
SECAM Color Pip	0~255	28	X	28		
Picture Limit	0~3	3	X	3		
OSD Contrast	0~15	10	X	10		
TTX Contrast	0~15	3	X	3		

[YC Delay]

Item	Range	Initial Data	Adjust	EEP-ROM Copy Data		
				43T6HP	43T7HF	Remark
P.YC(AV) Delay	-16~15	1	X	1		
S.YC(AV) Delay	-16~15	-5	X	-5		
N.YC(AV) Delay	-16~15	1	X	1		
P.BG.YC Delay	-16~15	1	X	1		
P.DK.YC Delay	-16~15	-2	X	-2		
P.I.YC Delay	-16~15	-2	X	-2		
P.M.YC Delay	-16~15	0	X	0		
P.L.YC Delay	-16~15	0	X	0		
S.BG.YC Delay	-16~15	-7	X	-7		
S.DK.YC Delay	-16~15	-10	X	-10		
S.I.YC Delay	-16~15	-9	X	-9		
S.M.YC Delay	-16~15	-7	X	-7		
S.L.YC Delay	-16~15	-10	X	-10		
N.M.YC Delay	-16~15	0	X	0		
N.4.43.YC Delay	-16~15	-1	X	-1		

[Option Byte]

Item	EEP-ROM Copy Data		
	SP43T6HP	SP43T7HF	Remark
Language	Only English	Only English	
Sound	Virtual Dolby	Dolby-Prologic	
CRT	4:3	4:3	
Channel	100-Channel	100-Channel	
X-RAY	On	On	
TTX	On	On	
Auto FM	On	On	
PIP	2-Tuner	2-Tuner	
Multi PIP	On	On	
LNA	On	On	
High DEV	On	On	
Scart	RCA+1SCART+DVD	RCA+1SCART+DVD	
Letter BOX	On	On	
DW PIP	Off	On	
TTX List Prior	Off	Off	Australia : On
TTX Language	West-Europe	West-Europe	
AGC	Off	Off	
AV Memory	Off	Off	Thailand : On
Australia	Off	Off	Australia : On
CG-Bright	On	Off	

Micom Module Pins & Voltage

Pin No	ITEM	Function	Voltage	Pin No	ITEM	Function	Voltage
1	KEY 1	KEY SCAN 1	2.28 V	33	5V	5 V	4.96 V
2	PROTECT	PROTECT PORT	0.83mV	34	H BLANK	HORIZONTAL BLANK	216 mV
3	KEY 2	KEY SCAN 2	2.25 V	35	GND	GND	-
4	GND	GND	-	36	V BLANK	VERTICAL BLANK	-12 mV
5	KEY 3	KEY SCAN 3	2.29 V	37	2RF-S	2RF-SWITCHING	298 mV
6	STB-5V	VCC	4.91 V	38	GND	GND	-
7	IR IN	REMOCON INPUT	3.74 V	39	GND	GND	-
8	POWER	POWER ON/OFF CONTROL	1.03 V	40	N.C	N.C	-
9	TIMER-LED	TIMER LED	2.07 V	41	VS1	VERTICAL SYNC	-
10	1080i	1080i MODE SWITCHING	2.53 V	42	N.C	N.C	-
11	GND	GND	-	43	HS1	HORIZONTAL SYNC	216 mV
12	V-RESET	VIDEO SIGNAL MUTE	2.84 V	44	N.C	N.C	-
13	SCL 1	SERIAL CLOCK LINE 1	3.43 V	45	GND	GND	-
14	GND	GND	-	46	S-SW1	SUB TUNER SWITCH 1	3.74 V
15	SDA 1	SERIAL DATA LINE 1	3.49 V	47	TTX-CVBS	TTX/CAPTION CVBS	1.19 V
16	S-RESET	SOUND RESET	4.21 V	48	GND	GND	-
17	ST-BY-LED	STAND-BY LED	2.95 V	49	GND	GND	-
18	RESET	RESET	2.47 V	50	S-SW2	SUB TUNER SWITCH 2	-
19	AMP-MUTE	SOUND AMP MUTE	0.89mV	51	AV-LINK	NOT USE	-
20	N.C	N.C	-	52	M-SW1	MAIN TUNER SWITCH 1	-
21	GND	GND	-	53	GND	GND	-
22	SW 1	SW1 (CONTROL)	4.58 V	54	M-SW2	MAIN TUNER SWITCH 2	-
23	SCL 2	SERIAL CLOCK LINE 2	3.27 V	55	RXD	RXD	-
24	C-SPK-MUTE	CENTER SPEAKER MUTE	3.26 V	56	GND	GND	-
25	SDA 2	SERIAL DATA LINE 2	3.27 V	57	TXD	TXD	-
26	SW 3	SW3 (CONTROL)	5 mV	58	OSD-TTX-R	ON SCREEN DISPLAY RED	168 mV
27	GND	GND	-	59	GND	GND	-
28	SW 2	SW2 (CONTROL)	2.08 V	60	OSD-TTX-G	ON SCREEN DISPLAY GREEN	0.46 V
29	GND	GND	2.57 V	61	WP	WRITE PROTECT	-
30	SUB-AFT	SUB TUNER AFT CONTROL	-	62	OSD-TTX-B	ON SCREEN DISPLAY BLUE	0.46 V
31	MAIN-AFT	MAIN TUNER AFT CONTROL	1.04 V	63	3.3 V	3.3 V	3.26 V
32	BUS-STOP	IIC BUS STOP	3.27 V	64	OSD-TTX-FB	OSD/TTX=FB	7.31mV

Scan Module Pins & Voltage

Pin No	ITEM	Function	Voltage	Pin No	ITEM	Function	Voltage
1	EW	EAST WEST OUT	2.26 V	33	5V DW-1	5V DW-1	4.97 V
2	V-BLK	VERTICAL BLANK	-12.07 mV	34	VM-Y	VM-Y OUTPUT	1.97 V
3	ABL	Automatic Brightness Limiter	2.26 V	35	SW 3	SW 3 (CONTROL)	4.98 mV
4	VD-	VERTICAL DRIVE -	3.46 V	36	SW 2	SW 2 (CONTROL)	2.08 V
5	VD+	VERTICAL DRIVE +	3.53 V	37	SW 1	SW 1 (CONTROL)	4.58 V
6	H-BLK	HORIZONTAL BLANKING	215 mV	38	GND	GND	-
7	HD	HORIZONTAL DRIVE	2.38 V	39	PIP-C	PIP-C INPUT	0.2 mV
8	GND	GND	-	40	PIP-Y/CVBS	PIP-Y/CVBS INPUT	1.33mV
9	OSD/TTX-FB	OSD/TTX-FB	7.29 mV	41	N.C	N.C	-
10	OSD/TTX-B	OSD/TTX-BLUE IN	0.46 mV	42	GND	GND	0.34 mV
11	OSD/TTX-G	OSD/TTX-GREEN IN	0.46 mV	43	Main-Y/CCVBS	Main-Y/CVBS INPUT	1.57 mV
12	OSD/TTX-R	OSD/TTX-BLUE IN	168 mV	44	N.C	N.C	-
13	V-RESET	VIDEO SIGNAL MUTE	2.94 mV	45	GND	GND	-
14	GND	GND	-	46	N.C	N.C	-
15	SCL1	SERIAL CLOCK LINE 1	3.42 V	47	GND	GND	-
16	SDA1	SERIAL DATA LINE 1	3.50 V	48	RF2-CVBS	RF2-CVBS	-
17	HS1	HORIZONTAL SYNC	251 mV	49	DVD-Pr/R	DVD-Pr/R (COMPONENT 1)	-
18	VS1	VERTICAL SYNC	27 mV	50	DVD-Y/G	DVD-Y/G (COMPONENT 1)	-
19	GND	GND	-	51	DVD-Pb/B	DVD-Pb/B (COMPONENT 1)	-
20	CG-R	CONVERGENCE RED	0.27 mV	52	FB	NOT USE	-
21	CG-G	CONVERGENCE GREEN	0.27 mV	53	GND	GND	-
22	CG-B	CONVERGENCE BLUE	0.29 mV	54	DTV1-Pr	DTV1-Pr (COMPONENT 2)	-
23	CG-SYNC	CONVERGENCE SYNC	180 mV	55	DTV1-Y	DTV1-Y (COMPONENT 2)	-
24	D/F	DYNAMIN FOCUS	1.5 V	56	DTV1-Pb	DTV1-Pb (COMPONENT 2)	-
25	GND	GND	-	57	GND	GND	-
26	9 V	9 V	9 V	58	DTV2-Pr	DTV2-Pr (COMPONENT 2)	-
27	GND	GND	-	59	DTV2-Y	DTV2-Y (COMPONENT 2)	-
28	N.C	N.C	-	60	DTV2-Pb	DTV2-Pb (COMPONENT 2)	-
29	RXD	RXD	-	61	GND	GND	-
30	TXD	TXD	-	62	5V DW-2	5V DW-2	4.89 V
31	GND	GND	-	63	DVI ID	N.C	-
32	13.5 V	13.5 V	14.05 V	64	PC ID	N.C	-

Convergence Module Pins & Voltage

Pin No	ITEM	Function	Voltage	Pin No	ITEM	Function	Voltage
1	5V CG	5V CG	5.2 V	17	GND	GND	-
2	GND	GND	-	18	GND	GND	-
3	D/F	DYNAMIC FOCUS	1.5 V	19	BV	BLUE VERTICAL OUT	-
4	GND	GND	-	20	BH	BLUE HORIZONTAL OUT	34 mV
5	SCL1	SERIAL CLOCK LINE 1	3.4 V	21	GV	GREEN VERTICAL OUT	-107 mV
6	CY-SYNC	CONVERGENCE SYNC	179 mV	22	GH	GREEN HORIZONTAL OUT	16 mV
7	GND	GND	-	23	RV	RED VERTICAL OUT	104 mV
8	N.C	N.C	5.2 V	24	RH	RED HORIZONTAL OUT	-89 mV
9	CG-R	CONVERGENCE RED	0.27 mV	25	GND	GND	-
10	CG-G	CONVERGENCE GREEN	0.26 mV	26	H-BLK	HORIZONTAL BLANK	275 mV
11	CG-B	CONVERGENCE BLUE	0.29 mV	27	V-BLK	VERTICAL BLANK	-13.22 mV
12	SDA1	SERIAL DATA LINE 1	3.5 V	28	GND	GND	-
13	NC	NC	-	29	N.C	N.C	-
14	IR	INPUT REMOCON	3.7 V	30	-5 V	-5 V	-4.99V
15	N.C	N.C	-	31	5 V	5 V	5.24 V
16	GND	GND	-	32	GND	GND	-

7. Troubleshooting

1.No Power (Power Lamp off)			
Power Chassis	Check point	Micom Module	Check point
Check Stand-By power terminal	FD801S : 125V 2.5A RS801S : 1/2W 10Ω ICS801 : VIPER12ADIP	Check Stand-By Power Line (STB-5V)	CN802 (#2 terminal) , L901
2.No Power (Power Lamp On State Latch-Up)			
Main Chassis	Check point	Micom Module	Check point
Check each power Line	5V : R802 (IC801) 5V-DW1 : R804 (IC801) 5V-DW2 : R806 (IC801) 9V : L604 (IC605 #3) 8V : L702 (IC701 #20)	Check SDA1, SCL1 Comm Error Measure resistance : 3kΩ↑	R906,R907 : 0 Ω
		Protect check Protect Terminal voltage : 1V ↓	If Protect voltage is 4V or higher, it means the bad Deflection circuit
Check SDA1, SCL1 Comm Error Check resistance :3kΩ↑	CN902 (12P) #2, #3	Check Key Matrix Voltage	KEY1,2,3 terminal - See the above key scan description
SUB Chassis	Check point	SCAN Module	Check point
Horizontal Drive Power Supply Line	FD855S(20V) : 125V 10A FD805S(13.5V) : 125V 5A	Check whether D/W module is properly inserted or not	CNW01

3.No Power (Power Lamp Off State Latch-Up)

Power Chassis	Check point	SUB Chassis	Check point
Check the secondary power fuse	FD855S, FD802S, FD871S, FD805S, FD854S	Check the secondary power check	117V, ±30V, 13.5V, ±8.5V
Check the primary power fuse	IC801S STR-X6456 FD801S : 125V 2.5A RS801S : 1/2W 10Ω	Check the horizontal terminal	R449 1W 0.47Ω Q423 C5039F Q431(2SC5446, FMP-3FU)
		Check H-BLK Line	Check V-BLK and Short

4.Power Off after the initial high-voltage operation at Power On : F/S operation

SUB Chassis	Check point		
Check High-voltage Protecter circuit	QR401S C815 IC471 TL494CN #4 voltage (Normal : 0V, Bad : 3V↑) Q473 IRFS640A , C4125		

5. Repeating Power Off/On

Main Chassis	Check point	Micom Module	Check point
Check each power line	5V-A, 9V, 13.5V, +5.4V	Check SDA1, SCL1 Comm error	C927, C928

6. Convergence

CRT PCB,Sub PCB	Check point	How to check
Check each power line	Check CN401 12V,220V Line	If disconnecting CN401 connector does not have the same voltage, check Sub PCB power line 12V : IC421 (78R12) 208V : R437 (R-Fusible, 2W 1.8Ω) If disconnecting CN401 connector shows the normal voltage, replace CRT PCB

7. Color convergence

CRT PCB	Check point	How to check
Screen voltage	CRT PCB의 Screen VR varied	If varying Screen VR changes the screen brightness but not the normal one, check R440 (1W 0.47) Fusible resistance of Sub board
CRT PCB	Check CRT PCB ,Main, PRT	Determine whether CRT PCB,Main or CRT is bad or not <Ex: Blue color convergence> If it normally operates by connecting Blue CRT PCB to G CRT but disconnecting Green CRT PCB, CRT PCB is determined normal. <= B PRT failure If Connecting Blue CRT PCB to G CRT shows failure, it means Main or CRT PCB. Then, if the same color is bad after changing G,B-out terminal of CN501 connector, replace CRT PCB. If not, replace D/W module of the main.

8.NO SOUND

MAIN,POWER PCB	Check point	How to check
Micom	Sound Mode	Check whether "Dolby Prologic" mode is normal or wide mode by pressing "Display" button of the remote controller <= Switch to Deselect mode.
Check each power line	Check +30V power	Determine whether 30V is applied to #3 terminal of Sound Amp IC (IC601) or not => If bad, check FD854S fuse of Power PCB => If the fuse is bad, you should check DZ605 zener characteristics of Main PCB.
MAIN PCB	Check MUTE voltage Check X601 Crystal oscillation	Check Mute voltage of #5 terminal of Sound Amp IC (IC601)=> 20V for normal => 30V for abnormal (check Q601,Q602,Q603 TR characteristics)
Others	IC602 , IC605 Speaker	If any mode of RF, Video or DVD only except the above condition is bad, check the waveform by referring the above Sound switching block. If only one sound is not heard, => Determine whether the speaker is bad or not by changing R/L terminal of CN601=> If the opposite side is bad, Speaker failure => Replace it after checking the jack

9. Bright image

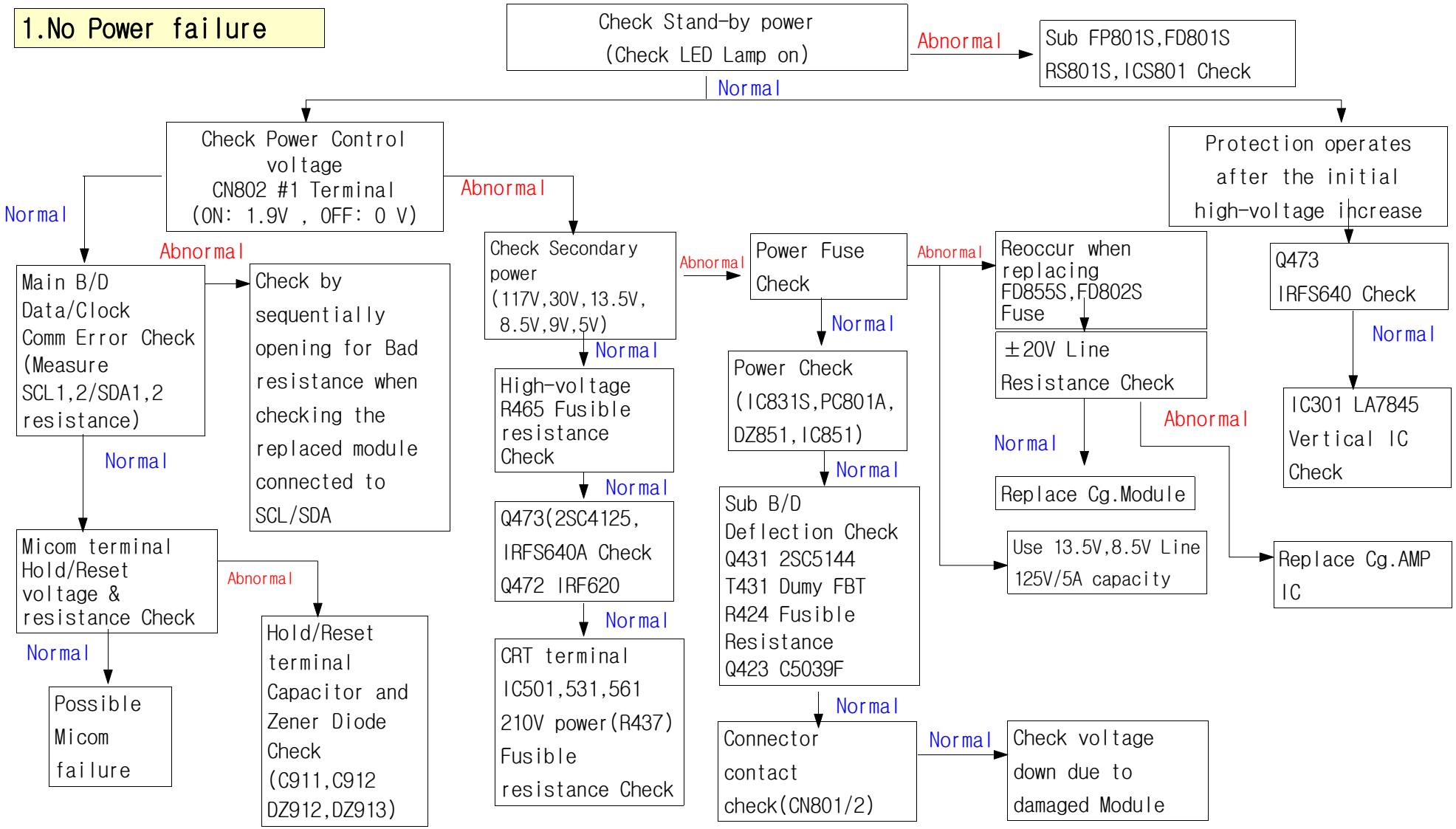
MAIN,Sub PCB	Check point	How to check
Micom	Display Mode	Check the display change by varying "Display mode" of the remote controller.
MAIN,SUB	CN802 ABL terminal	Check Scan module if ABL voltage changes by varying Display mode If not, check FBT ABL terminal

10.PRT failure (Replace PRT ASSY)

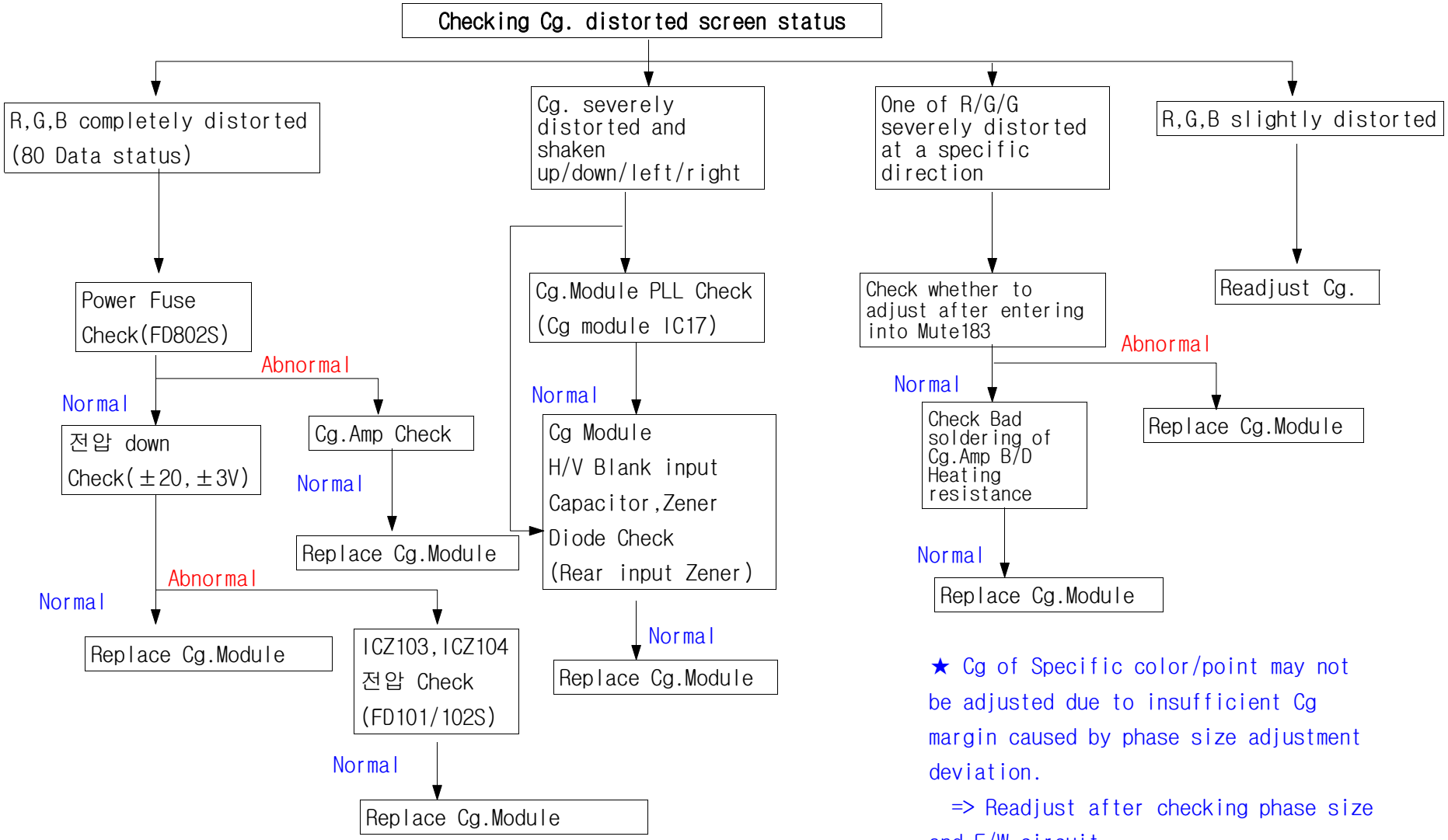
Symptom	Cause	How to check
●FOCUS is not varied =>One color focus of R/G/B not varied =>If all focus of R/G/B shows bad, it does not mean PRT failure	■PRT assy failure	▶ Determine whether CRT PCB,Focus Pack or PRT is bad or not <Ex: Green Focus failure> ;PRT failure if the same failure occurs by disconnecting Green CRT PCB and connecting Blue CRT PCB to G CRT <= Replace G PRT ;Focus Pack failure if the same color is bad by changing the wire connected to the focus pack
●SPOT (SE) =>Afterimage at the screen center at TV power off.	■PRT assy failure	▶ Determine whether CRT PCB or PRT is bad or not <Ex: Green Focus failure> ;PRT failure if the same failure occurs by disconnecting Green CRT PCB and connecting Blue CRT PCB to G CRT <= Replace G PRT
● Liquid leakage => Various symptoms such as power/screen failure	■PRT assy/job failure	▶ Check the liquid leakage of PRT with the naked eye ;Check the leakage of Main,Sub,Power,CRT PCB ;Replace the leaked PRT assy
● Discharge =>Discharge noise and POWER OFF	■PRT assy failure ■PRT Crack	▶ Check the discharged PRT with the naked eye ; Replace the PRT after checking Anode Cap,PRT Neck with the naked eye
● Color convergence => Convergence or R/G/B color convergence	■PRT assy failure	▶ Determine whether CRT PCB or PRT is bad or not <Ex: Blue color convergence> CRT PCB is determined as normal if it normally operates by disconnecting Green CRT PCB and connecting Blue CRT PCB to G CRT <= B PRT failure
☞ Before replacing PRT ASSY, you should determine whether there exists any failure by replacing CRT PCB or Focus Wire.		

Trouble Shooting for major failure

1.No Power failure



2.Convergence failure

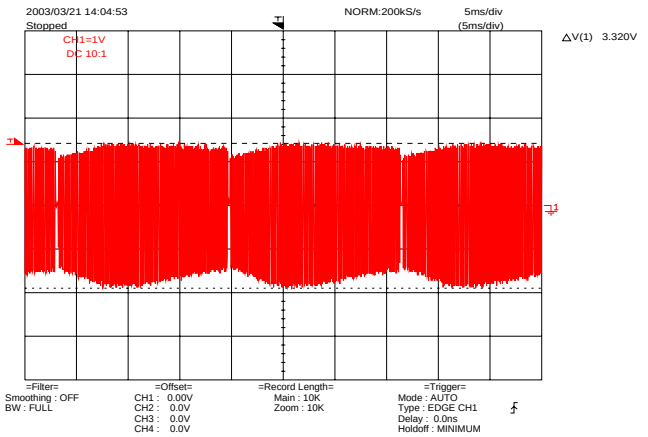


★ Cg of Specific color/point may not be adjusted due to insufficient Cg margin caused by phase size adjustment deviation.

=> Readjust after checking phase size and E/W circuit

Convergence Block

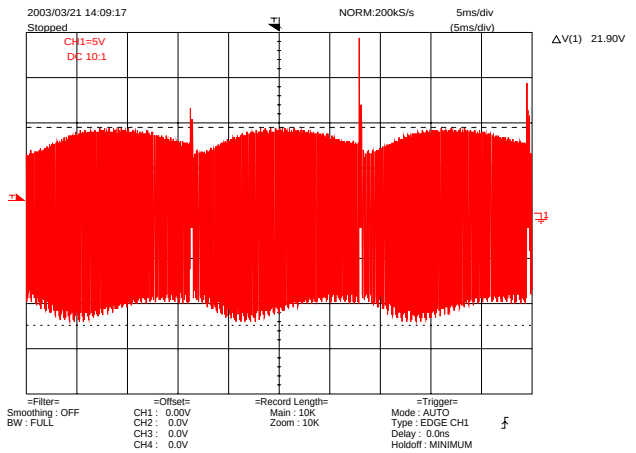
Cg Module RH



V/div : 1V
T/div : 5 mS
Vp-p : 3.32V

[Check Point]
CNZ01 #24

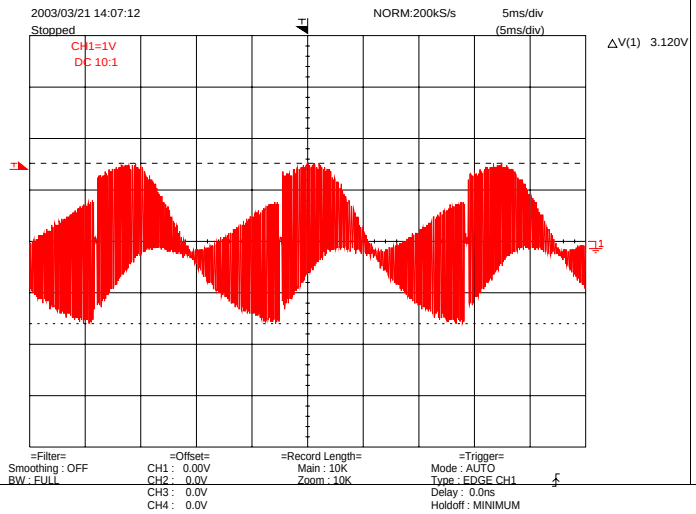
Cg Amp IC RH



V/div : 5 V
T/div : 5 mS
Vp-p : 21.9 V

[Check Point]
CNZ04 #4

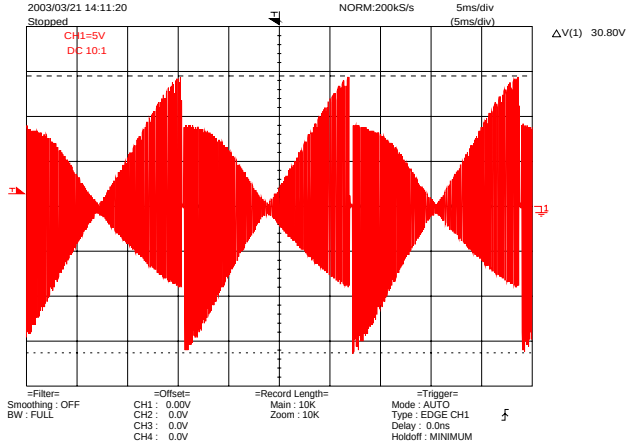
Cg Module RV



V/div : 1 V
T/div : 5 mS
Vp-p : 3.12 V

[Check Point]
CNZ01 #23

Cg Amp IC RV

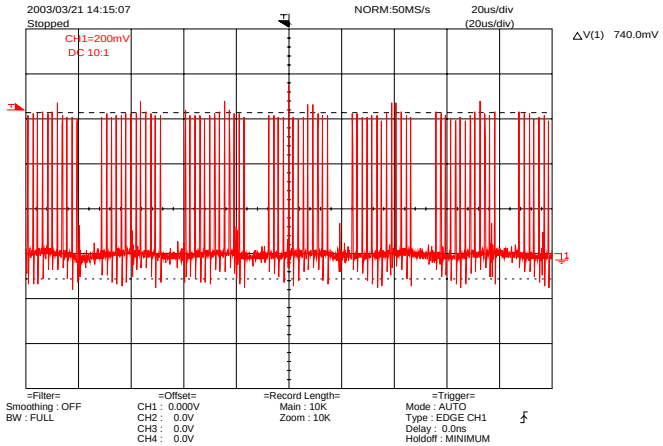


V/div : 5 V
T/div : 5 mS
Vp-p : 30.8 V

[Check Point]
CNZ04 #2

Convergence Block

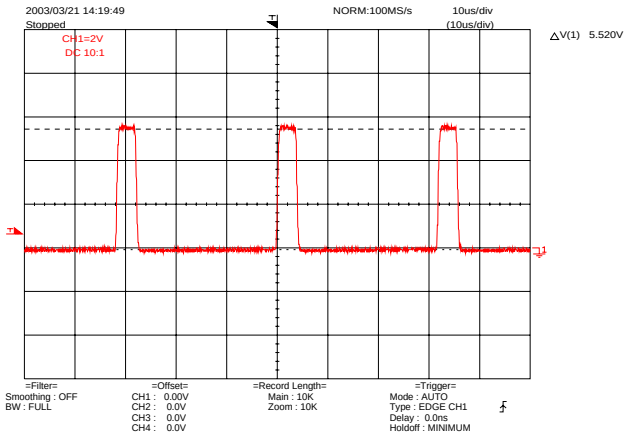
Cg Module CG-G (Pattern)



V/div : 200mV
T/div : 20 uS
Vp-p : 740mV

[Check Point]
CNZ01 #10

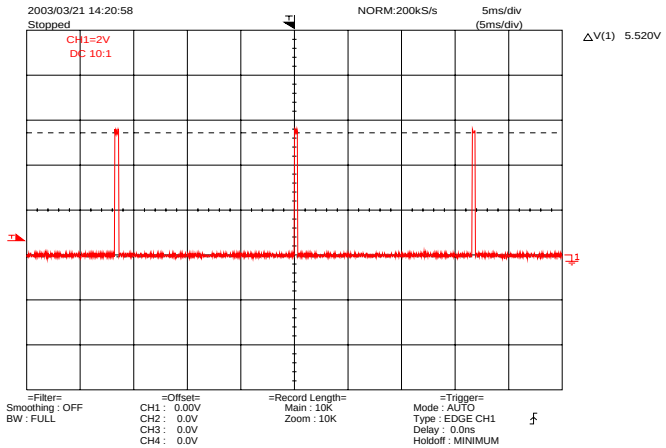
Cg Module H-BLK



V/div : 2 V
T/div : 10uS
Vp-p : 5.5 V

[Check Point]
CNZ01 #26

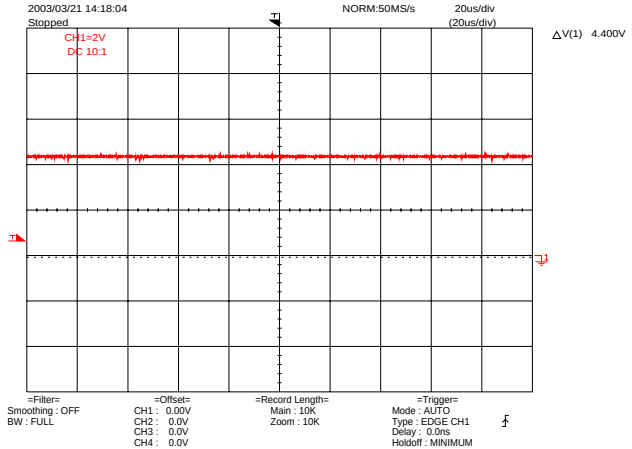
Cg Module V-BLK



V/div : 2 V
T/div : 5 mS
Vp-p : 5.52 V

[Check Point]
CNZ01 #27

cg sync

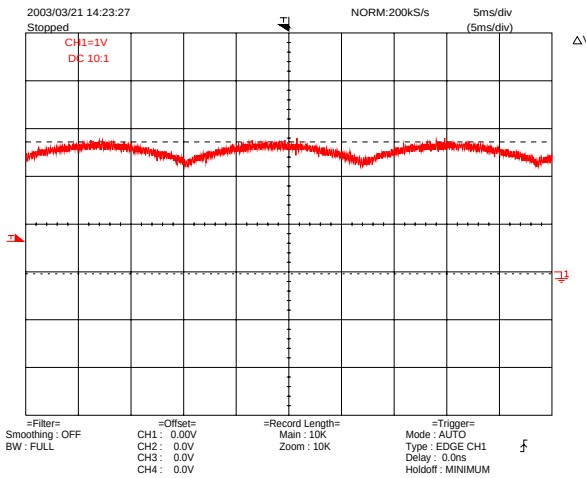


V/div : 2 V
T/div : 10uS
V : 4.4 V DC

[Check Point]
CNZ01 #6

E/W Block

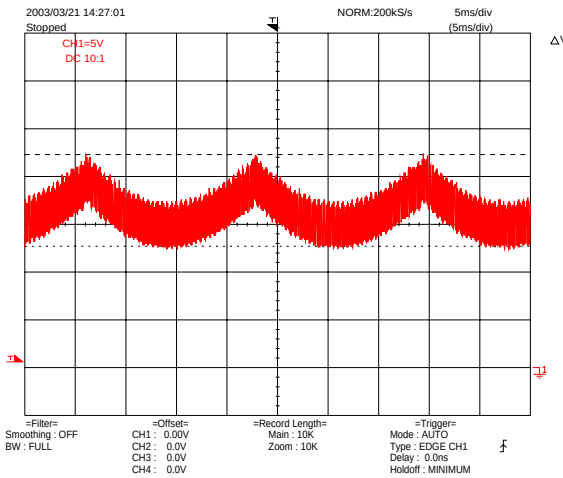
E/W Input



V/div : 1 V
T/div : 5 mS
V : 2.76V DC

[Check Point]
CN902 #7

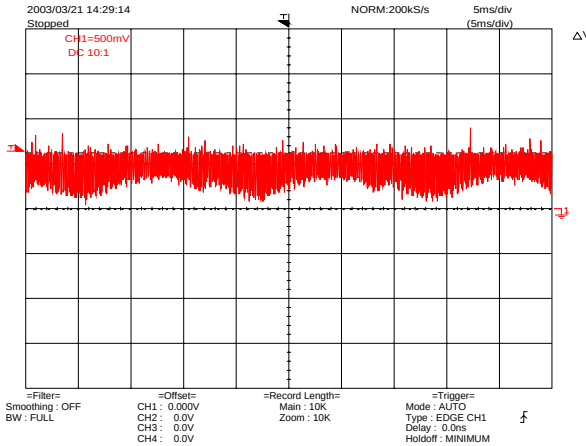
E/W OP Amp IC Output



V/div : 5 V
T/div : 5 mS
Vp-p : 9.6 V

[Check Point]
IC431 #1

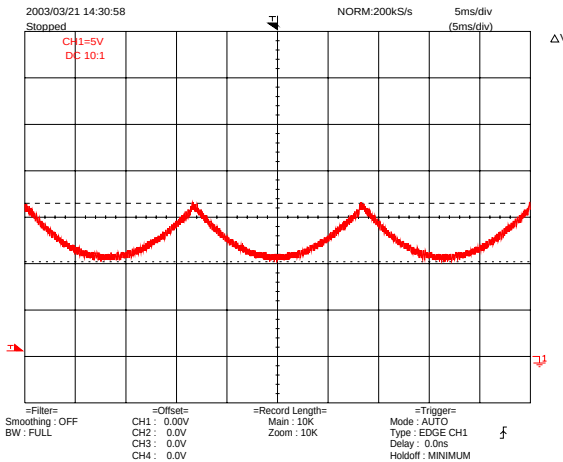
E/W Amp TR Input



V/div : 500mV
T/div : 5 mS
Vp-p : 0.63 V

[Check Point]
Q433 Base

E/W Amp TR Output

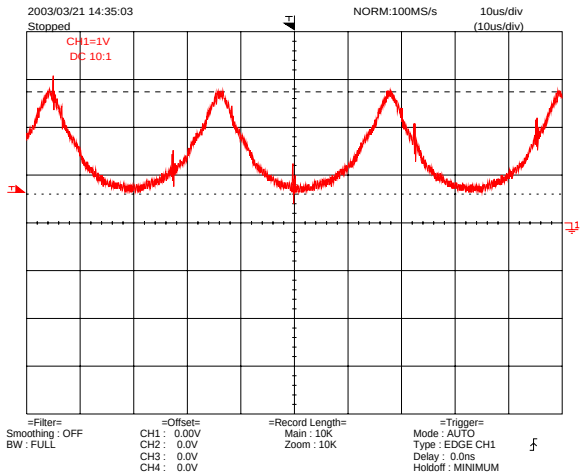


V/div : 5 V
T/div : 5 mS
Vp-p : 6.3 V

[Check Point]
Q433 Collector

Dynamic Focus Block

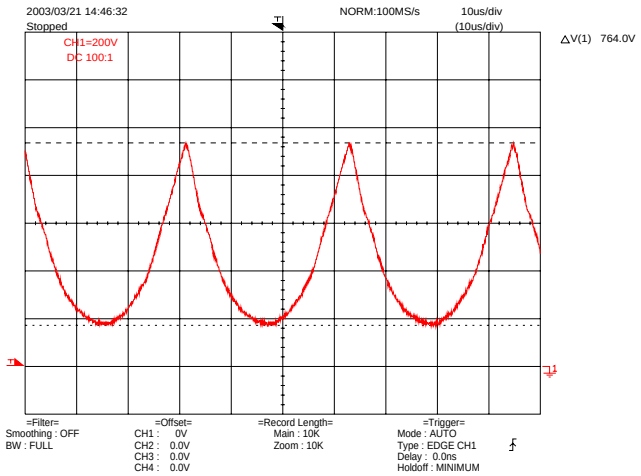
D/Focus Input signal (Horizontal)



V/div : 1 V
T/div : 10 uS
Vp-p : 2.14V

[Check Point]
CNZ01 #3

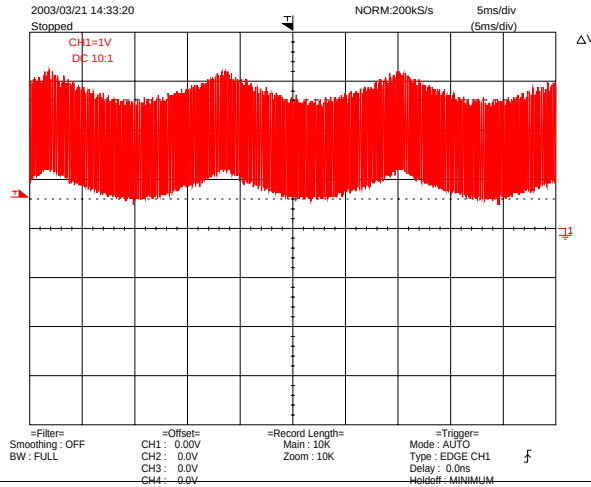
D/Focus Output signal (Horizontal)



V/div : 200 V
T/div : 10uS
Vp-p : 764V

[Check Point]
Focus pcak
D/F terminal

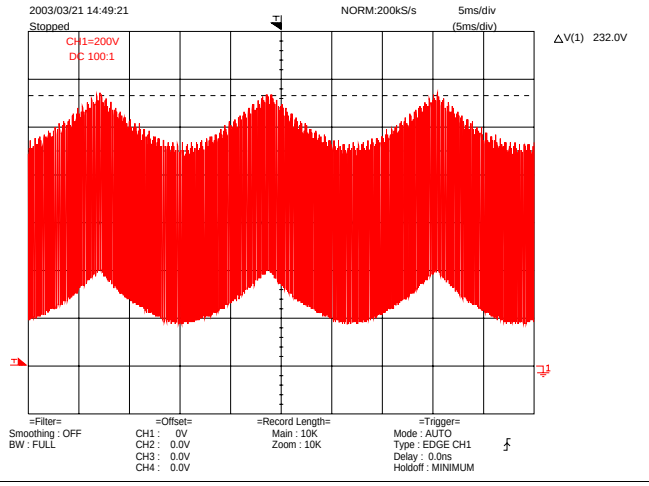
D/Focus Input signal (Vertical)



V/div : 1 V
T/div : 5 mS
Vp-p : 0.62V

[Check Point]
CNZ01 #3

D/Focus Output signal (Vertical)

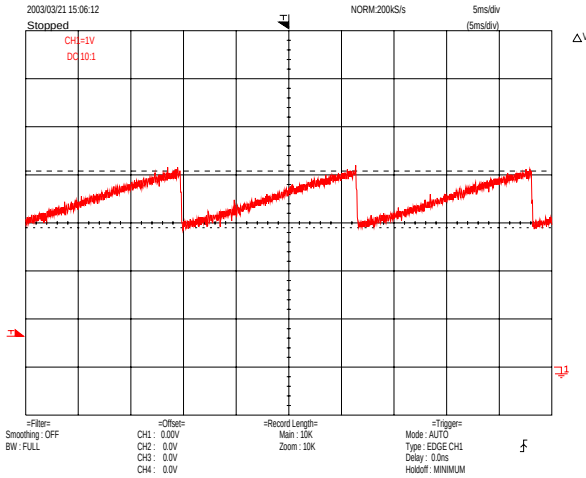


V/div : 200V
T/div : 5 mS
Vp-p : 232V

[Check Point]
Focus pcak
D/F terminal

Vertical Deflection Block

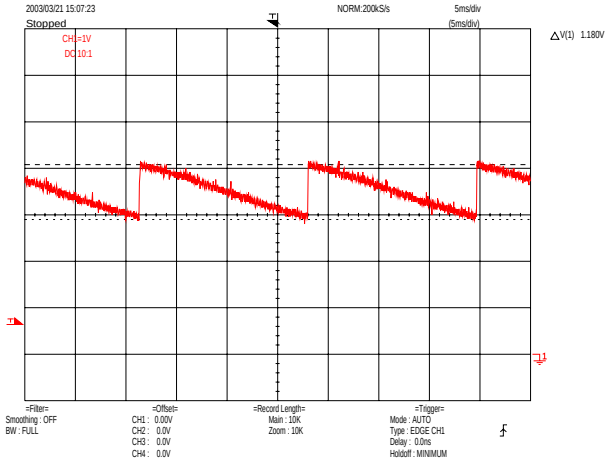
VD -



V/div : 1 V
T/div : 5 mS
Vp-p : 1.18 V

[Check Point]
CN802 #8

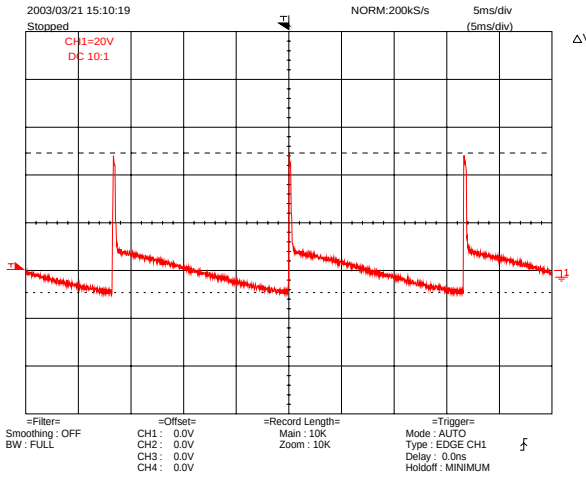
VD +



V/div : 1 V
T/div : 5 mS
Vp-p : 1.18 V

[Check Point]
CN802 #9

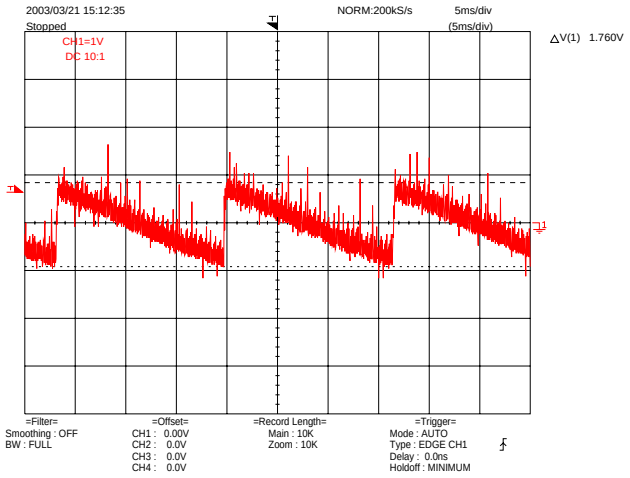
Vertical IC Output



V/div : 20 V
T/div : 5 mS
Vp-p : 58.4 V

[Check Point]
IC301 #2

Vertical Feed Back

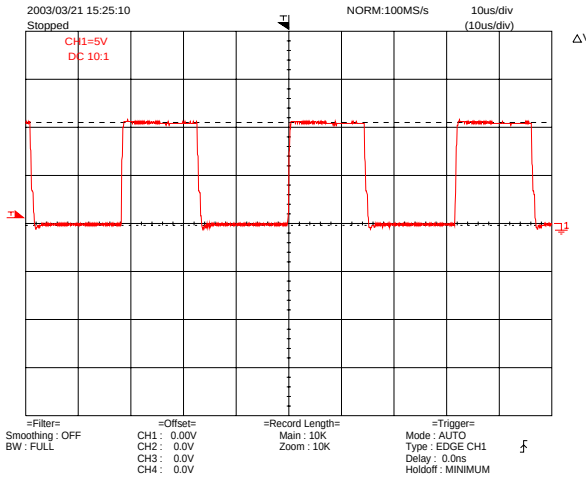


V/div : 1 V
T/div : 5 mS
Vp-p : 1.76V

[Check Point]
GT03 ~ R307

Horizontal Deflection Block

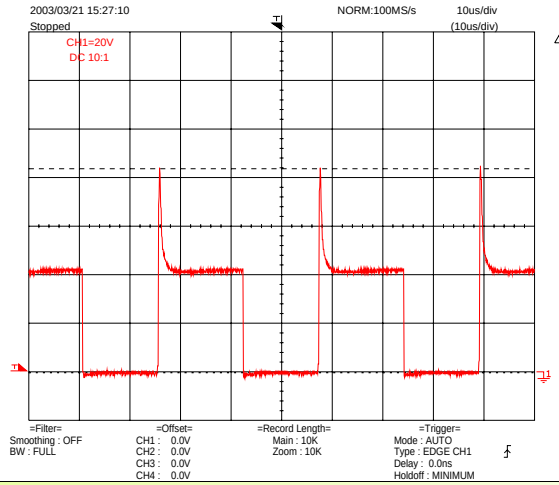
H-Drive



V/div : 5 V
T/div : 10 uS
Vp-p : 10.7V

[Check Point]
Q422 Gate
(IRF620)

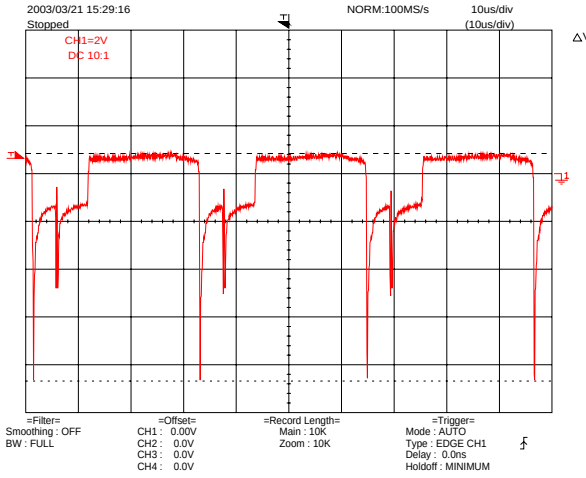
HDT



V/div : 20 V
T/div : 10 uS
Vp-p : 84 V

[Check Point]
Q422 Drain
(IRF620)

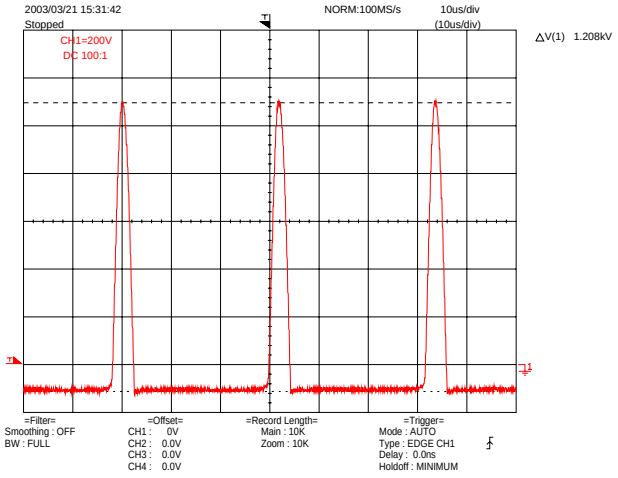
H-Out TR



V/div : 2 V
T/div : 10 uS
Vp-p : 9.52V

[Check Point]
Q431 Base
(2SC5446)

H-Out TR

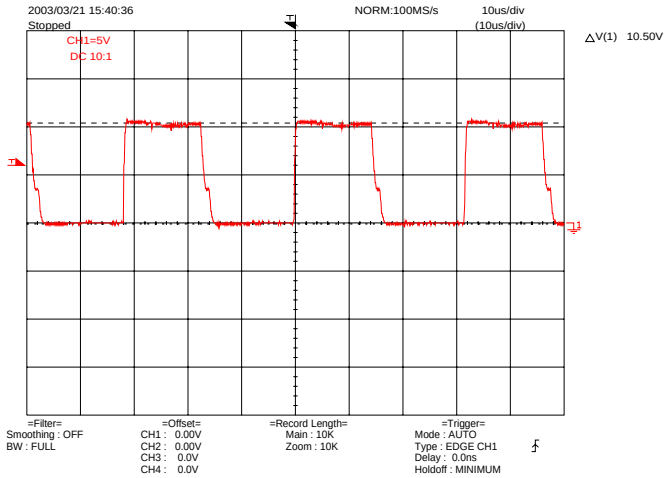


V/div : 200V
T/div : 10 uS
Vp-p : 1208V

[Check Point]
Q431 Collector
(2SC5446)

High Vovtage Block

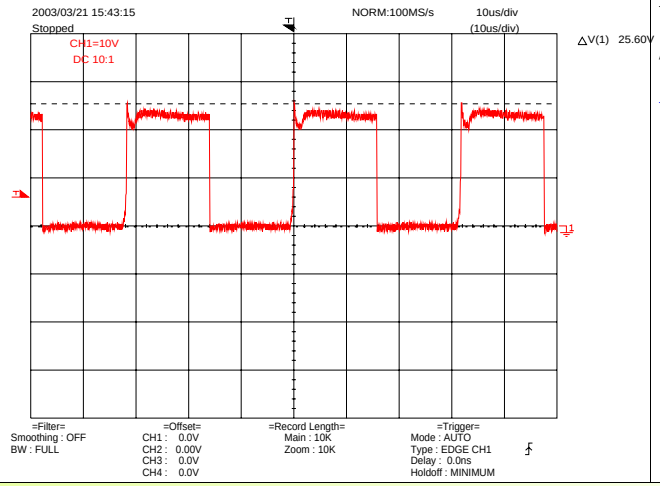
H.V Drive



V/div : 5 V
T/div : 10 uS
Vp-p : 10.7 V

[Check Point]
Q472 Gate
(IRF620)

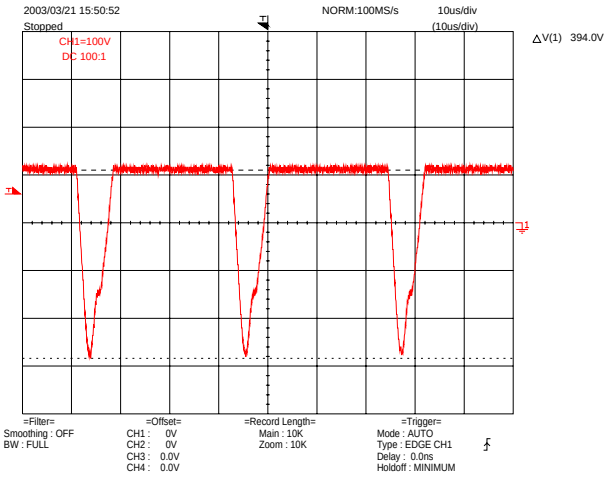
HDT



V/div : 20 V
T/div : 10 uS
Vp-p : 84 V

[Check Point]
Q472 Drain
(IRF620)

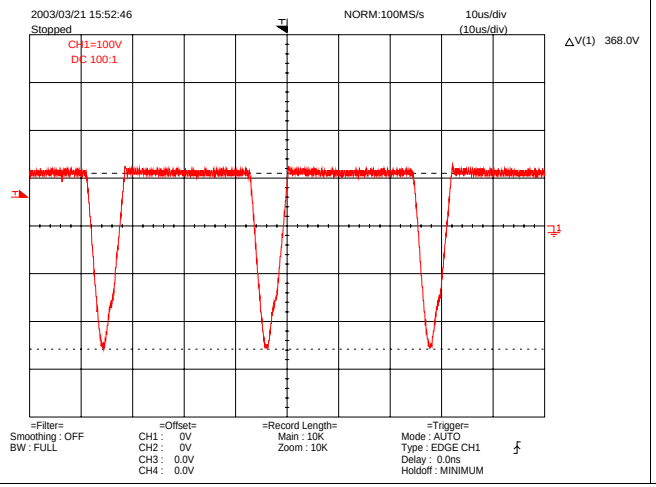
HV Out TR



V/div : 100 V
T/div : 10 uS
Vp-p : 394 V

[Check Point]
Q473 Bace
(2SC4125)

HV Out TR

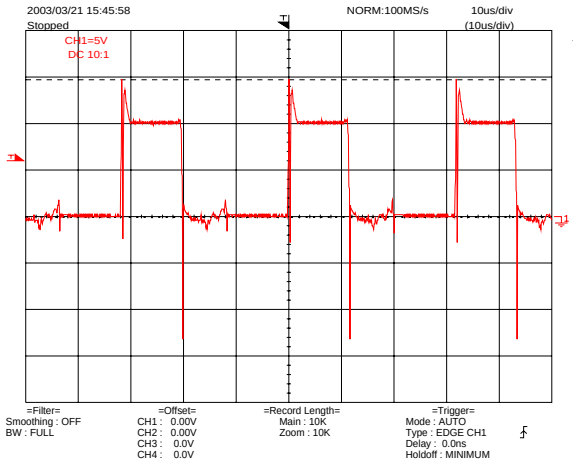


V/div : 100V
T/div : 10 uS
Vp-p : 368 V

[Check Point]
Q473 Emitter
(2SC4125)

High Vovtage Block

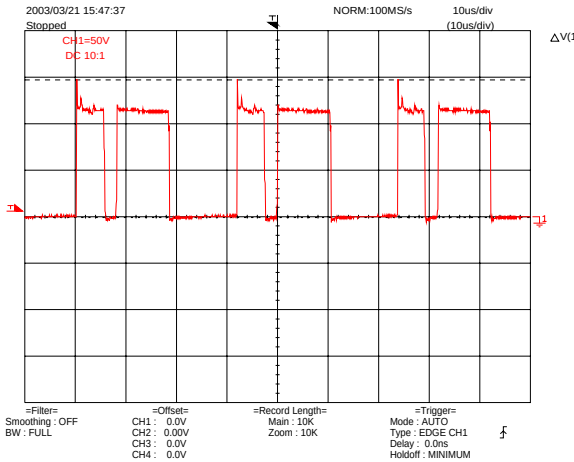
H.V Regulation signal



V/div : 5 V
T/div : 10 uS
Vp-p : 14.8 V

[Check Point]
Q473 Gate
(IRFS640A)

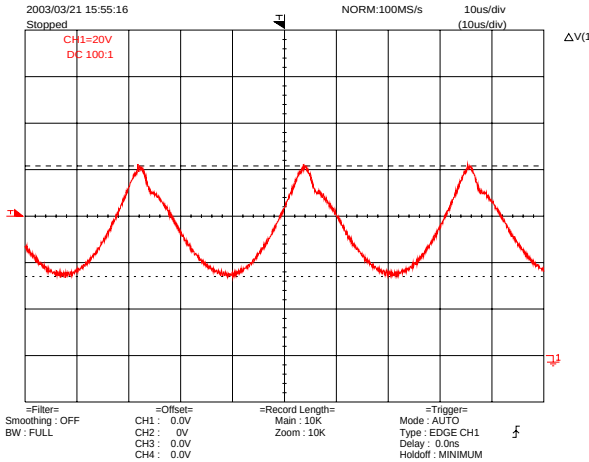
H.V Regulation signal



V/div : 5 V
T/div : 10 uS
Vp-p : 148 V

[Check Point]
Q473 Drain
(IRFS640A)

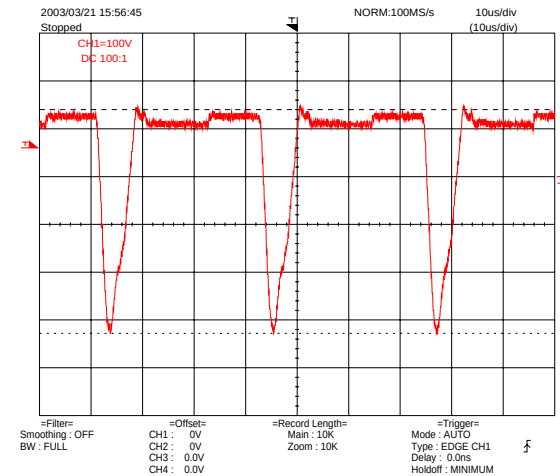
FBT



V/div : 20 V
T/div : 10 uS
Vp-p : 47.6 V

[Check Point]
FBT #1 Pin

FBT



V/div : 100 V
T/div : 10 uS
Vp-p : 468 V

[Check Point]
FBT #2 Pin

8. New Model in 2004

1. Trend of Competitors' products

□ Toshiba

- Launching Dolby Digital B/i PJTV('01), Rear/Woofer SPK separately sold
- €500 Premium at the launcing time → €100 Premium (at the present)
- Its advantage gets smaller with comparison to the existing HTS because Surround SPK and Woofer SPK should be separately sold.

경쟁사	도시바	삼성
모델명	42WH18P	SP43H3HT
디자인		
Retail Price	€1,999(현재) €1,899(Jan.04기준 예상)	€2,199(Dec.03,도입시점) 43W6 : €1,899(Feb.04)
Display	100Hz	100Hz & Progressive
Sound System	Dolby Digital	Dolby Digital, DPL II, DTS
SPK	15W x 2(Main L/R)	20W x 5(L/R, SL/SR, C) + 80W(Subwoofer)
Sound output	70W	180W
Digital Audio in	Coaxial, Optical	Optical
Audio out	SL/SR, C, Woofer	X
DVDP	X	Slim DVDP Deck

2. Product overview

1.VOC (Voice of Customer)

☐ PJTV vs HTS Customer Research Result

Item	PJTV	H/T
Purchase criteria	Wide screen > Good quality > Desire to show off	Value vs price > SPK power & sound quality > DVDP combination
Dissatisfaction/Improvement	Image quality > Price > Size > Sound quality	Inconvenience to install and to use > Sound > Image quality
Purchase age	40s > 30s > 20s (Korea) 30s > 40s > 20s (Russia)	40s > 30s > 20s > 50s (Korea)
Double purchase rate	H/T double purchase rate of PJTV gets the highest for 30% or lower vs TV price and 25% for domestic	
Connecting product	Connecting product when purchasing PJTV : VCR(75.8%) > DVDP(71.6%) > H/T(51.2%) > Set top Box	
Other	Design of major causes (GMO research) for purchasing H/T system gets the highest point	

- Disadvantages of Separate Type HTS
  - . Hard to install and use
  - . Too many cables for interior
  - . Take much space
  - . Expensive(including TV)

Hard to install SPK

Complicated cables

Take too much space

- Home Theater System which customers desire to buy
  - . Vivid and wide screen - PJTV, PDP, Projector, LCD TV
  - . Vivid surrounding sound just like 5.1ch - Dolby Digital, DTS, Surround
  - . Easy to install and operate (Wireless, All-in-One Set) : HTS easy for even women of 50s to install
  - . Design suitable for interior(No Wire, interior Design) : No damage for living room, saving space
  - . Feasible price : All-in-One, Package, alternate model

2. Product Concept

□ The first TV-Theater in the world

- Combining the vivid image of the wide screen with the vivid surrounding sound of 5.1ch' into a TV

□ Sound

- Dolby AC3, Dolby Prologic II, DTS built in
  . Dolby AC3 : Standard Sound System of digital TV, essential for popularization because it can accept most of DVD titles
  . Dolby Prologic II : Transforming a general 2Ch stereo broadcasting signal into 5.1Ch
  . DTS : Preparing for DVD movie contents and creating a movie mania market
- 5.1ch' SPK built in : Main L/R, Center, Surround L/R, Woofer SPK x2
  . Surround LR applies Reflector SPK
- Optical Digital Audio input preparing for DTV STB : Accomodating all Video/Audio Digital broadcasting programs
- Hi-power Sound out : 20W x5 + 80W woofer = 180W

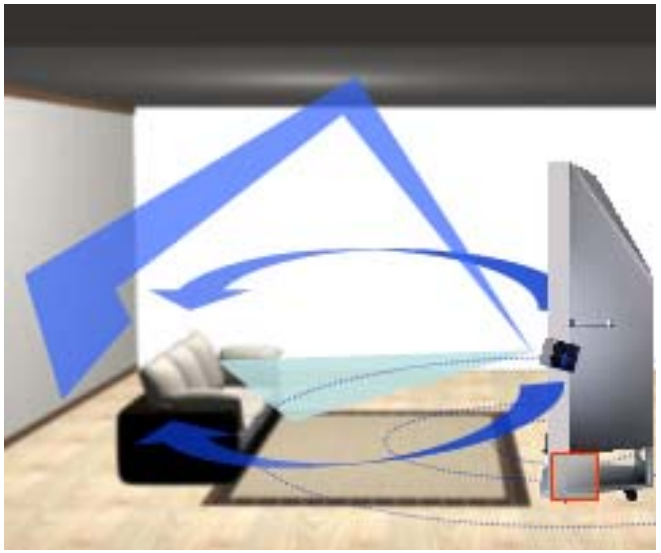
□ Circuit

- Applying Champ chassis
  → Applying DNIeII, New GUI, New transmitter, Wide viewing angle
- Applying Slim type DVDP(Option) : 6X speed, DVD/VCD/CD/MP3 compatible

□ Design

- Sound concentrated Design : Design easily to recognize that HTS이 All-in-one is applied
- Screen Size : 43W, 52W

- Integrated Cabinet : Rack with Woofer SPK built in

□ Concept - Reflector SPK

- Rear SPK effect by reflecting the surrounding sound wave on walls and the ceiling
- Direction softer than Rear SPK(similar to the effect just like a theater with several Side SPKs)